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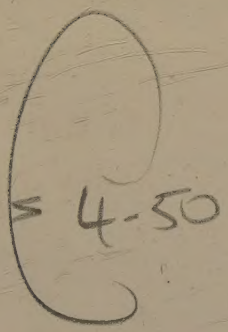

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PHARMACEUTICAL JOURNAL

AND

TRANSACTIONS.

VOLUME XVI.

1856–57.

EDITED BY

JACOB BELL.

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THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. X.—APRIL 1st, 1857.

POOR-LAW MEDICAL RELIEF.

There is a continual strife between the promoters of the centralizing system of the Poor-law Board, and the advocates of local self-government. That some of the regulations of the Board are harsh and oppressive to the poor—that laws suitable to one parish or union, may be, and in many cases are, inapplicable to another—that local Boards are in general more competent than a central authority at a distance to deal with the wants and requirements of their respective localities,—are propositions which have been of late warmly discussed, and more or less supported by evidence.

An association under the name of the "Anti-Poor-law Board League," emanating from the parishes of Marylebone and St. Pancras, has, within a few months, opened an extensive correspondence with malcontents in parishes and unions in all parts of the kingdom, and is collecting evidence with a view of introducing an amendment of the law in the ensuing Parliament.

The only branch of the questions at issue which it comes within our province to notice, is the medical department, including the supply of drugs, in which there is great need of inquiry and reform. The underpaid Medical Officer of a parish or union has no means of redress. His remuneration is in some cases scarcely sufficient to cover the cost of the medicines supplied. The average payment per case varies from threepence to three or four shillings, with a few exceptions, in which a larger sum is given; but in a great number of cases the amount is less than two shillings per case. Many of the districts comprise an area of several miles in diameter, requiring the entire services of a horse (sometimes two horses), and the salary bears no definite or just proportion to the amount of professional labour and the necessary expenses. The Surgeon of the Sherbourne Union, for example, who lately resigned, travelled in one year 3111 miles; in nine years two horses were worn out in the work, the salary being £63 per annum with extras (£25 or £30) for amputations, fractures, and labours. It is estimated that the actual cost of medicines per case, exclusive of any allowance for rent and expenses of surgery, is not less than 1*s.* 6*d.* or 2*s.*; in tedious cases, it is several times that amount. The lowest estimate for the expenses of a horse and gig is £87 per annum—£100 would be a more correct amount. But the salary usually given is so inadequate as not only to afford no remuneration for professional services, but often to entail on the Medical Officer a positive loss. If, however, he should presume to remonstrate with his task-masters, and to represent the fact that he is a loser of so many pounds per annum, his services being given for nothing, he is referred to the Poor-law Board, and thence back again to the Board of Guardians; and if, no redress being granted, he still is dissatisfied, he is told that the remedy is in his own hands—he may resign—and the Board will soon find a young man fresh from some hospital eager for "an opening" and glad to make himself known in the neighbourhood by doing the parish work on any terms. This then is the alternative of the Poor-law Medical Officer. He must either continue to perform the duties on the miserable terms offered, or a rival is to be brought down to re-

lieve him of this duty and at the same time take away a considerable slice of his private practice.

In May, 1856, a Poor-law Medical Reform Association was formed under the patronage of the Earl of Shaftesbury, and an extensive correspondence has taken place on the subject. Mr. Richard Griffin (of Weymouth), the Chairman of the Association, has published a valuable and interesting pamphlet, entitled "*A Statement of the Grievances of the Poor-law Medical Officers, with Remarks on Sanitary Measures and Vaccination*,"* addressed to the Right Hon. Viscount Palmerston. This pamphlet contains, in addition to much statistical information, a specimen of the *modus operandi* of the Poor-law Board in such cases, detailed in the correspondence of Mr. Griffin with the Board, which, after a rather voluminous exposition of facts and ample evidence of the grievance complained of, terminates with a simple acknowledgment of the receipt of Mr. Griffin's last appeal, and the assurance that "the subject to which it relates shall receive attention." This is the stereotyped answer to such communications. If it be true that "a mild answer turneth away wrath," the complainants in these cases have no reason to be angry, for nothing could be more mild than a form of words which has no definite meaning, being used in a figurative sense like the words "obedient servant" at the end of a letter.

On Thursday, March 12th, a large aggregate meeting of the Medical Students of the metropolis and the provinces was held at St. Martin's Hall, with a view of aiding the cause of Poor-law Medical Reform. Mr. Layard, M.P., took the chair; and several resolutions, affirming the existence of the evils complained of, and indicating a determination to persevere in obtaining redress, were ably supported and carried by acclamation.

It is the object of this movement to bring the subject under the notice of Parliament, with a view of obtaining the recognition and fair remuneration of the services of the Medical Officers of parishes and unions, the amount of salary being made to bear some definite relation to the services performed, expenses incurred, and goods supplied. It was demonstrated by the speakers at the above meeting, some of whom spoke from their own personal experience, that the prevalent custom of screwing down the Medical Officers is a source of increased expenditure; that, for want of a proper and efficient adaptation of means to the end, many cases of illness are protracted, and families thrown upon their parishes for relief; and that not only humanity, but economy, demands that the sick shall be cured as speedily as possible. It is also considered desirable that, wherever it is practicable, a separate provision should be made for the supply of medicines; for when the contract with the Medical Officer is so low as scarcely to cover the cost of the drugs required, the inevitable result must be a deficiency both in the quantity and quality.

The parish of Marylebone, not being under the direct control of the Poor-law Board, and having a densely-populated area to provide with medical relief, has the means of avoiding the abuses which prevail under the centralizing system, and at the same time carrying out the principle of the division of labour. The workhouse contains accommodation for nearly 300 patients in the infirmary, besides about the same number of "convalescents"—comprising aged, infirm, and imbecile. The entire number of inmates fluctuates from 1500 to 2000 or more. The number of medical orders for out-door relief ranges from 8000 to 15,000 in the year. The Medical Staff, prior to March, 1855, consisted of an Honorary Physician, an Honorary Surgeon, an Honorary Physician-Accoucheur, a Resident Physician (or Surgeon-Apothecary) at £150 per annum, a Medical Officer to the Workhouse at £80, two Visiting Surgeon-Apothecaries at £80 each, and two Dispensers at £60 and £40 with board and lodging. The medicines were purchased by sample and tender by a Committee, assisted by

* London: Simpkin, Marshall, and Co. Weymouth: D. Archer

the Medical Officers, which sat quarterly, three or four respectable wholesale houses furnishing samples with prices. In case of an epidemic or unusual pressure from any cause, an additional Medical Officer (or more than one, if necessary) was temporarily engaged.

By this arrangement the evils existing under the Poor-law Board were avoided. The supply of medical advice and medicine was regulated by the demand, all parties concerned, except the honorary staff,* were fairly remunerated, and the poor had no cause of complaint. These regulations subsisted with but little modification for many years, and might have continued up to the present time if differences had not arisen between the Medical Staff and the Guardians. The Board being a fluctuating body, annually elected, and consisting of tradesmen and gentlemen, some of whom, on coming fresh into office, had various notions as to the mode of sustaining the dignity of the Board, collisions with the Medical Officers sometimes occurred, and these gentlemen in their turn felt it to be their duty to support the dignity of the profession. Hence, while some of the Guardians would occasionally "snub" the Medical Officers, this treatment was resented by supercilious behaviour bordering on contempt; and, while the system was in theory such as might have been taken as a model for any parish of sufficient extent to carry it into effect, its harmonious working was practically impaired by occasional cabals, and an undercurrent of jealousy of "the doctors" on one side and contempt of the Guardians on the other. Sometimes for months together the business of the establishment proceeded harmoniously and apparently to the satisfaction of all parties, but occasionally, on some trivial circumstance requiring an explanation or inquiry, the latent spark of distrust or jealousy for a time renewed the struggle between the dignity of the Board and the dignity of the Profession.

In March, 1855, after a series of efforts and many close divisions, an alteration in the system was introduced. The Visiting Surgeons were dismissed, and the out-door poor placed under the care of five Medical Officers, being general practitioners, four of whom had salaries of £100 per annum, and the fifth £80, for attendance in their respective districts, including the supply of medicine. It was expected that by this change a saving would have been effected, and the discipline of the Medical Staff improved. Early in the present year a Committee was appointed to investigate the matter, and report as to the result of the experiment. From this inquiry it appeared that, for twelve months of the new system, the actual cost was £2015 1*s.* 3*d.*, or £379 16*s.* more than in 1854, while the number of patients was less, and the medical orders 1649 less than in the last-mentioned year. The Committee therefore recommended a further change in the system, which, after much discussion, was adopted by the Board, and is described in the following advertisement:—

"St. Marylebone Workhouse.—The directors and guardians of the poor of this parish will meet in the Board Room of the Workhouse, on Tuesday, the 3rd day of March next, at 11 o'clock in the forenoon, to receive applications from duly qualified Medical Practitioners (about forty years of age), being Members of the Royal College of Surgeons, London, stating the sum at which they will contract to, on all occasions, medically attend the poor (being inmates of the workhouse), providing all drugs, chemicals, surgical instruments, and appliances (except trusses). The gentleman selected will have to reside in the immediate neighbourhood, to be accessible at all times when required, and to provide and pay the salary (which is not to be less than £100 per annum) of a legally qualified assistant, for whom the board of guardians will provide board, lodging, and washing. The board do not bind

* The Physician formerly had £200 per annum, but upon a vacancy occurring, several candidates offered to take the office without salary, a proposition too tempting to be disregarded by the Guardians.

themselves to accept the lowest or either of the tenders. Applicants will have to attend personally at the time above mentioned, and the form of contract can be seen at the office of the secretary (who will afford every information); and letters of application, with diplomas, &c., must be left at his office on or before the day preceding that above mentioned.

"(By order) THOMAS B. RAE, *Secretary.*

"*Secretary's Office, Feb.* 14, 1857."

Prior to the adoption of this resolution by the Board, the Honorary Physician and Surgeon were, very properly, consulted; but the opinions of these gentlemen, being decidedly adverse to the proposed change, were disregarded. The subject was also animadverted upon rather severely in some of the medical journals, which, of course, had no influence. It was doubted by some persons whether any Medical Men of standing in the profession would enter into competition for a position so speculative and precarious. The Medical Officer of a Union may be obliged to retain his situation on any terms, to keep a rival out of the way; but in this case no such motive could exist, and the statistics, on which alone any calculation could be founded, exhibited so much fluctuation in several of the items during a series of five or six years, that any estimate of the probable cost of the services and materials required could be little more than a random guess. Among the conditions of the contract, it is stipulated that the stock of drugs in the infirmary is to be taken at a valuation; that a room is to be provided by the Board, in which medicines are to be kept for use; but no tinctures, &c., are to be prepared on the premises, and no Apprentice is to be permitted to frequent the wards or the dead-house. The Resident Assistant is to be paid by the Medical Officer, but liable to dismissal by the Board of Guardians. The Medical Officer, also, is liable to dismissal by the Board; but, in the event of his resignation without three months' notice, he is to pay a penalty of £50. Some of the clauses in the contract are original; others are copied verbatim from the contracts prepared by the Poor-law Board for the Medical Officers of Unions. It appears remarkable that this system of farming the sick poor by contract, which is the most objectionable feature in the plan of the Poor-law Board, should have been imitated, and adopted in an aggravated form, in a parish where the mortal antipathy to that Board has called into existence a "league" for its reformation or suppression. It is no less unaccountable that a Board of Guardians, whose watchword is "local self-government," having every facility for carrying the theory into practice, should have stultified themselves by throwing on a contractor the entire responsibility of managing the medical department of the workhouse,—an implied admission of their own incompetence.

The number of competitors for the place considerably exceeded our anticipation: but the wide range of amounts in the tenders confirmed our impression as to the speculative nature of the venture. The highest tender was £1000, the lowest £500; the one accepted by the Board was £950. The successful competitor is a fully qualified and respected practitioner, a circumstance favourable to the success of the experiment, although it does not diminish our objection to the *principle* of making a contracting party responsible for the variable fluctuations of health and disease in a populous parish, whose representatives are in duty bound to regulate the supply of medical treatment and appliances according to the demand.

THE EDUCATIONAL FUNCTIONS OF THE PHARMACEUTICAL SOCIETY.

THE Legislature has given to the Members of the Pharmaceutical Society a title and status, as a recognition of the service the Society has conferred, and is continuing to confer on the public. It is therefore of the highest importance

that those functions upon which our character as a body is founded, should be maintained unimpaired, with such modifications or improvements as circumstances may require.

The Pharmaceutical Society is not, in the ordinary sense of the term, an educating body; that is to say, it does not depend for its revenue upon the fees paid by Students for instruction in its School. This branch of the establishment has never been a source of profit; on the contrary, it has been attended with a considerable annual expenditure—an expenditure, however, which was necessary for the accomplishment of the objects contemplated by the Society, and which has contributed to its reputation as a scientific institution.

The Society having been empowered by Royal Charter to examine Candidates and grant diplomas or certificates, it was necessary to adopt effectual means for ensuring the requisite standard of proficiency. To a certain extent this object was sought to be attained by the circulation of a detailed programme, enumerating the branches of knowledge on which the Candidates were to be examined. Books on the several subjects were recommended, and those Students who had the opportunity, were advised in general terms to attend lectures on Chemistry, Materia Medica, and Botany. This, however, was seldom practicable. Young men residing in the neighbourhood of a medical school enjoyed some advantages, but their number was very limited, and no institution existed in this country in which the lectures were adapted expressly to the requirements of the Pharmaceutical Student. It was therefore considered expedient, and in fact necessary, to found a course of lectures on Pharmacy, with other lectures and practical instruction suitable for the purpose intended.

The Board of Examiners, in the first instance, found it necessary to deal very leniently with candidates, who presented themselves under great disadvantages, having no definite idea as to the extent of the knowledge they were expected to possess, or the course of study required for obtaining it. By degrees the nature of the examination became more generally understood, and some young men, by the aid of books and great personal industry, acquitted themselves much to the satisfaction of the Board. But the number of those who possess the tact and ability to qualify themselves unassisted, bears a small proportion to the entire class of Pharmaceutical Students; it is therefore of great importance to provide means of improvement adapted to the wants of the majority, and thus to remove the pretext for incompetence and mediocrity.

It is not necessary that any Candidate shall become a Student in the School of the Society. If he can qualify himself elsewhere, he is no less favourably received by the Board of Examiners. But to those young men who do not enjoy the requisite facilities for improvement in their respective localities, the School of Pharmacy affords every advantage that they could desire.

The lectures on Chemistry and Pharmacy, and on Botany and Materia Medica, are free to all Members and Associates, as well as to Candidates preparing for examination. The practical class of instruction in the laboratory is open to Students on terms which afford a very moderate remuneration to the Professor and assistants, and from which no revenue is derived by the Society. The course of study is adapted to the requirements of the Pharmaceutical Chemist, comprising two branches, synthetical and analytical.

The Lower Laboratory, containing accommodation for twenty Students, is devoted to synthetical operations, namely, the preparation of all the salts and other compounds of the metals, earths, alkalies, and acids, the processes of the Pharmacopœia, vegetable extracts, syrups, spirits, ethers, pigments, organic principles and products, &c.

The Upper Laboratory is chiefly devoted to analytical processes. It affords accommodation for ten Students, who are enabled to prosecute chemical researches to any extent that they may desire. The opportunity for classification, by means of an upper and lower laboratory, is found convenient. The more

advanced Students, who are occupied with analytical processes, have occasion to use sulphuretted hydrogen and other gases, which might interfere with some of the preparations in the other department: it is also an advantage to provide separate accommodation for Students who are commencing the rudiments of their education, and for those who are more advanced and are engaged in tedious processes or delicate chemical manipulations.

The Library is accessible to all Students, and may be resorted to in the evening by those who desire to make the best use of their time and the advantages offered.

The number of Students usually ranges from twenty to thirty. Some enter for the entire season, comprising ten months, which is recommended as the best course to pursue when practicable; but others not being able to devote so much time to their education, the total number of young men who derive more or less benefit from the school in the course of the year amounts to thirty-five or forty. Assuming that all these young men qualify themselves, and sooner or later pass the examination, which we believe to be the case, and that some of those who pass obtain their education elsewhere, it will be seen that the supply of competent Pharmaceutical Chemists is sufficient to take the place of those who, in the ordinary course of events, die or retire from business; and while the Society is essentially an examining body, its educational functions are auxiliary to that object, and have the effect of raising the standard of qualification.

BOTANY.

With a view of encouraging the study of Botany, a branch of knowledge hitherto much neglected by Chemists and Druggists, Mr. Bentley has obtained from the Council of the Royal Botanical Society admission for thirteen Students, during a certain number of hours each day, for the session. This will afford facilities for the study of the characters of plants, of which the garden contains an extensive collection, one portion of the ground being devoted exclusively to medical plants. As a further stimulus to industry, Mr. Bentley has made the enjoyment of the privilege to depend on the result of an examination in botany, held for the purpose; and has given the admissions to the thirteen Candidates whose merit at the examination entitled them to the distinction:—

Messrs. Samuel Banner, Robert G. West, J. P. Featherstone, A. Scholefield, Hugh Gill, Thomas J. Cutting, Charles Weston, P. C. Jones, William Sanger, J. Bourdas, C. F. Rowell, John Fletcher, W. Smeeton.

The orders are available for six months, and admit the bearer from 7 o'clock in the morning till 1 P.M. during the summer months, and from 9 A.M to 1 P.M. in the winter months.

The medal offered by the Council for the best herbarium of indigenous plants is intended as an additional inducement to study Botany, and the season is commencing during which the attention of Students may be favourably directed to this subject. The Pharmaceutical Chemist ought not to be at the mercy of the herbalist who supplies him with medicinal plants, but should be able to recognize, by their botanical characters and physical properties, all vegetable substances comprised in the Materia Medica, and to detect the accidental substitution of one drug for another if such casualties should occur.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

FINANCIAL STATEMENT,
From January 1st to December 31st, 1856.

RECEIPTS.

	£	s.	d.
Balance in Treasurer's Hands	333	2	0
5 Life Members' Fees ... 47 5 0			
Interest ... 33 13 10			
	80	18	10
Benevolent Fund:			
Subscriptions ... 46 6 0			
Interest ... 131 3 6			
	177	9	6
Government Securities, Interest	173	6	10
385 Town Members' Subscriptions ... 404 5 0			
1777 Country Members ... 1860 12 0			
274 Associates ... 143 17 0			
226 Apprentices ... 118 13 0			
	2527	7	0
Fees:			
15 Pharmaceutical Chemists ... 94 10 0			
26 Assistants ... 128 2 0			
64 Apprentices ... 144 18 0			
	367	10	0
Arrears of Subscriptions	97	16	6
Lecture Fees	22	1	0
Sale of Journals	4	14	6
Balance of Petty Cash due to Secretary	2	9	10
	£3786	16	0

EXPENDITURE.

	£	s.	d.
Life Members' Fund Investment	117	13	10
Benevolent Fund:			
Investment ... 111 7 9			
Gratuities ... 26 0 0			
	137	7	9
Invested in Government Securities	300	0	0
Repayments	0	10	6
Conversazione, Pharmaceutical Meetings, &c.	42	19	9
House Expenses	35	18	8
Rent, Rates, and Taxes	297	15	6
Fixtures and Fittings	10	2	0
Apparatus	63	13	6
Postages	61	10	2
Stationery	13	2	3
Advertisements	15	7	0
Printing and Engraving	99	1	9
Collector's Commission	29	11	3
Board of Examiners	33	12	0
Expenses of Society in Scotland	57	13	10
Travelling Expenses, Country Members of Council	87	18	11
Salaries	300	0	0
Wages	169	0	0
Journals	662	10	0
Delivery of Journals	181	12	3
Library	19	5	0
Professor of Materia Medica and Botany, including duties as Curator in his department, and payment of Assistant	137	10	0
Professor of Chemistry and Pharmacy, including duties as Curator in his department, and payment of Assistant	225	0	0
Subscription to Royal Botanical Gardens	21	0	0
Solicitors' Costs	5	12	6
Balance in Treasurer's hands	504	16	0
" in Secretary's ditto ... 107 2 1			
Less Post-office Order out of date ... 0 10 6			
	106	11	7
	£3786	16	0

We, the undersigned Auditors, have examined the accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1856:

		£	s.	d.
On account of the General Fund	New 3 per Cents.	6345	4	8
Benevolent Fund	3 per Cent. Consols	4801	1	1
Life Members' Fund, 3 per Cent. Consols		1325	18	7
And at that date there was due to the Life Members' Fund		10	10	0

GEORGE S. PEDLER,
JOHN CARR,
WILLIAM BOWER,
ADOLPHUS FREDERICK HASELDEN,
ARTHUR BOWDLER HILL,
Auditors.

3rd February, 1857.

Correct—S. T. COOPER, *Accountant.*

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in March.

MEMBERS.

LIVERPOOL	Marks, Edward Lloyd
LONDON	Andrews, Frederick
	Francis, George
	Frask, Thomas

MAJOR EXAMINATION.

Patterson, Douglas John	Nottingham
Smeeton, William	Ironbridge
West, Robert G.	Liverpool
Weston, Charles	Lincoln

MINOR EXAMINATION.

Brown, John	London
Dixon, Henry	Spalding
Jones, Humphrey	Chester
Wheldon, Henry	Atherstone
Valancé, Charles Poupinel	Mauritius

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Carre, Louis C. A.	Mr. Tylee	Bath
Dunhill, William W.		Doncaster
Edwards, Frederick H.	Mr. Medcalf	Lower Tooting
Gibbs, Thomas	Mr. Stewart	Great Yarmouth
Goldfinch, George	Mr. Goldfinch	London
Hill, Francis	Mr. Reinhardt	Leeds
Langley, William	Mr. Tylee	Bath
Oliver, John H.	Mr. Fletcher	Cheltenham
Price, Thomas	Mr. Laen	Pembroke Dock
Walker, George	Mr. Goodall	Derby

AT A MEETING OF THE COUNCIL,

Held February 4th, 1857,

The following Members of the Council were drawn by lot to remain in office for the ensuing year:—JACOB BELL, THOMAS A. BREW, JOHN B. EDWARDS, DANIEL B. HANBURY, GEORGE R. KEELING, NATHANIEL SMITH, and GEORGE WAUGH.

PHARMACEUTICAL MEETING,

Wednesday, March 4th, 1857,

MR. BIRD, VICE-PRESIDENT, IN THE CHAIR.

THE following donations were announced:—

Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
London University Calendar for 1857, from the University.
London Pharmacopœia for 1746, from Mr. G. Whipple.
Seeds of *Cycas revoluta*, from Foo-Chow, China. A very fine specimen. From Mr. D. Hanbury.
A large Crystal of Potash Iron Alum, from Mr. Copney.

Mr. DANIEL HANBURY exhibited a specimen of *Liquidambar orientale* (of Miller), from the coast of Asia Minor, opposite Rhodes.

The following papers were read:—

ON THE TOXICOLOGY OF STRYCHNINE.

BY J. E. D. RODGERS, ESQ.,
Lecturer on Chemistry at St. George's School of Medicine; and

G. P. GIRDWOOD, ESQ.,
Assistant-Surgeon, Grenadier Guards.

Can strychnine be detected after death, when it has been administered in a dose only sufficient to destroy life? or is it so altered in the process of destruction of life, as to cease to be strychnine? are questions that it is the object of this paper to answer.

Let us first inquire the facts upon which the opinion that strychnine *cannot* be detected in the tissues and fluids of the body is based, and it will soon be seen that they are of the most slender nature, founded on the results of experiments and analyses of a most unsatisfactory and imperfect character.

Dr. Christison, many years ago, poisoned animals with doses of strychnine varying in strength, and generally failed in its discovery by subsequent analysis. Dr. Taylor, at the trial of William Palmer, gave in evidence that he had killed four rabbits by the administration of strychnine. In the first experiment he gave two grains; in the second and third, one grain; and in the fourth, half a grain; and failed to discover it by chemical means in three out of the four—the successful case being that in which he had given the large dose of two grains—a dose which every one must admit far exceeds the quantity necessary to destroy life. Drs. De Vry and Van de Burgh, from their interesting and well-devised series of experiments, the results of which were given in a paper read at the last meeting of this Society, have come to the conclusion that it can only be detected when the dose given exceeds that necessary to destroy life.

Let us next inquire what are the essentials of a process that will enable the analyst to obtain the strychnine in such a condition as to prove its presence indubitably. They are, that it should be capable of disintegrating the substances in which it is present, so completely, that it cannot escape solution; and that, finally, it should yield the strychnine in a state of perfect freedom from foreign organic matter.

Have the processes employed by Drs. Christison, Taylor, De Vry, and Van de Burgh these requisites? Decidedly not. The process given by Dr. Taylor at the trial of Palmer—and Dr. Christison stated on that occasion that he had pursued a similar mode of analysis—consisted in digesting the matter suspected in spirit of wine acidulated with sulphuric acid, filtering, gently evaporating, and finally adding carbonate of potash to precipitate the strychnine, which was then tested. We need scarcely remark that such a process would never yield strychnine, if present in minute quantity, in that state of freedom from organic matter to admit of satisfactory testing, and would utterly fail when blood, urine, and tissues were the subjects of analysis; indeed, it is obvious that the minute quantity to be extracted in the latter analysis could never be precipitated at all, seeing that each drop of water is capable of retaining $\frac{1}{7000}$ of a grain of strychnine. The process of Staâs adopted by Dr. De Vry is immeasurably superior to the preceding, but that it is not possessed of the requisite degree of perfection is evident from his own experiment cited in proof of its perfection. This experiment, you may remember, consisted in mixing the quarter of a grain of strychnine with one egg, and then coagulating the mixture by the heat of boiling water, and subjecting it to Staâs' process, by which he recovered "*almost the whole*" of the strychnine. This word "almost" proves the imperfection of the process, for it shows that under favourable circumstances a quantity appreciable by the balance was lost, while in the analysis of urine, bones, and small quantities of the other tissues, you have to separate an amount of poison that is quite inap-

preciable by the balance. The loss is owing to the fact that the spirit of wine and acid employed do not disintegrate the tissues in the manner necessary for the separation of the quantity of strychnine conveyed by the blood to the various tissues and organs; indeed, the hardening effect of the spirit would rather favour the retention than the separation of the strychnine.

The process adopted by us is as follows:—The substance operated upon is digested with dilute hydrochloric acid, one to ten, until it is apparently fluid; the liquid is then filtered and evaporated to dryness over a water-bath, treated with spirit as long as anything is dissolved, and the filtered tincture evaporated as before, and the residue treated with water and filtered; this aqueous solution must now be rendered alkaline by ammonia, and agitated in a bottle or long tube, with about half an ounce of chloroform; after subsidence, the chloroform is drawn off by means of a pipette, transferred to an evaporating basin, and the chloroform expelled over a water-bath; the residue must then be moistened with concentrated sulphuric acid, and exposed for some hours to the temperature of a water-bath, by which proceeding all organic matter except the strychnine is destroyed. The charred mass is then treated with water, and the solution filtered to separate the carbon; excess of ammonia is now added, and the solution again agitated with about one drachm of chloroform; if on evaporating a small portion of this chloroform solution, and treating the residue with concentrated sulphuric acid, any charring takes place, the preceding process must be repeated, when the last chloroform solution will afford the strychnine sufficiently pure for conclusive testing. For this purpose a small quantity is taken up in a capillary tube, and allowed to evaporate on the smallest spot possible of a warm porcelain capsule, by adding successive drops until the whole is evaporated on the spot. If the quantity is large—say from the $\frac{1}{20000}$ of a grain to a larger quantity—the method we have pursued is similar to that employed by Dr. De Vry and others, viz., moistening the spot (when the capsule is quite cold) with concentrated sulphuric acid, and then adding a minute fragment of bichromate of potash. If, however, the quantity is very small, no colour will be perceived by this mode of testing, then the sulphuric acid rendered slightly yellow by chromic acid will be found successful.

We would here remark that the recommendation to stir the spot moistened with sulphuric acid with a glass rod, previous to the addition of the bichromate, is highly objectionable, and will frequently occasion failure, by removing the acid sulphate of strychnine, which would otherwise, by adhering to the porcelain, facilitate the action of the test. The superiority of our mode of operating will be seen by the following analyses, performed during the last few days. On the 26th ult., at three o'clock P.M., $\frac{1}{30}$ of a grain of strychnine was given to a rabbit weighing nearly four pounds; at four a second $\frac{1}{30}$; at half-past four a third dose was administered, after which he evinced slight signs of twitching on being touched, or on a noise; at five a fourth dose was given; at half-past five a glass beaker fell and was broken near him, which caused a sudden spasm with opisthotonos (lasting fifteen seconds); at a quarter to six another $\frac{1}{30}$ (making $\frac{5}{30}$ths) was given; at twelve minutes past six a bunch of keys was dropped near him; the noise occasioned an immediate spasm, accompanied, as before, with opisthotonos, which lasted a few seconds; a second on touching him, followed by a remission; when, on again touching him, a third attack was produced, which ended fatally in a few seconds, relaxation of all the muscles indicating decease; rigor mortis came on in three minutes after death, and passed off in the succeeding twenty-four hours. On examination the blood was found coagulated. The contents of the stomach, analyzed by the process given, yielded strychnine in abundance.

Half a pound of flesh also yielded strychnine in abundance. Two drachms of urine collected after death, also yielded strychnine by the following mode of analysis: it was diluted with an ounce of water, rendered alkaline by ammonia, and filtered; the filtrate was then agitated with chloroform in a long tube, the

chloroform separated as directed, was then evaporated in a porcelain dish, the residue charred with sulphuric acid, as already detailed; this operation was repeated three times, when the last chloroform solution yielded the strychnine as stated.

The bones of the extremities, the pelvis, and part of the vertibral column, containing its share of the spinal marrow, all being entirely denuded of flesh, were treated as follows: They were covered in a deep evaporating basin with dilute hydrochloric acid, and digested over a water-bath until the whole were dissolved; the solution filtered, the filtrate was then treated with concentrated sulphuric acid drop by drop as long as a precipitate fell, adding water when necessary; the solution was again filtered, and about six drachms of sulphate of magnesia and ammonia in excess added; the solution was again filtered, and the clear liquid agitated with chloroform; the chloroform solution, after being treated in the way already detailed, yielded distinct evidence of strychnine.

To these results must be added our former experiments, which we have already published, and which were briefly as follows:—

The blood and contents of stomach of a dog poisoned by two grains of strychnine were, after putrefaction, subjected to analysis, both yielding strychnine.

The muscles, viscera, and bones of a dog, poisoned with a grain of strychnine, were separately subjected to analysis, thirteen months after interment. Strychnine was discovered in every instance.

The organs and contents of stomach of a rabbit, poisoned by half a grain of strychnine, yielded that alkaloid in each analysis.

The viscera and contents of stomach of a rabbit poisoned by half a grain of strychnine and five grains of tartar emetic, yielded antimony and strychnine also in each analysis.

The body of this rabbit was allowed to decompose in contact with air for nine months. When dry, the bones separated, and all the other tissues, almost pulverulent, subjected to the mode of analysis described by us for the bones, yielded abundance of strychnine.

From the results of the foregoing experiments, we cannot avoid the following conclusions:—

(1.) That the opinion, that strychnine can only be detected when the poison is in excess, is untenable, and not supported by trustworthy analyses.

(2.) That the opinion, that strychnine is decomposed in the process of destruction of life, is founded on the results of analyses made by imperfect processes, and hence is unsound and unphilosophical.

(3.) That strychnine can always be detected, when it has occasioned death, in the blood, organs, and tissues of the body, quite independently of the contents of the stomach.

(4.) That it is found unchanged in the urine.

(5.) That the delicacy of the reactions of strychnine, and its extraordinary stable qualities, render its detection more certain than any other poison.

Dr. De Vry was glad that, happening to be in London, he had an opportunity of hearing the interesting communication just read. He had no hesitation in saying that he thought the process described by Mr. Rodgers for extracting the strychnine from organic substances a very good one, and he purposed making trial of it when he returned to his own laboratory.

Mr. Copney mentioned a case in which he failed to detect strychnine in the urine of a patient taking the alkaloid, although he adopted the process recommended by Mr. Rodgers for its detection.

Mr. Rodgers said that in such a case as that alluded to by Mr. Copney it might be necessary to operate upon a larger quantity of the urine than was used in the experiment described.

THE URARI, OR ARROW POISON OF THE INDIANS OF GUIANA.

Remarks in continuation to those contained in the seventh volume of the Annals of Natural History.

BY SIR ROBERT H. SCHOMBURGK, Ph.D.,
Honorary Member of the Pharmaceutical Society of Great Britain.

I PUBLISHED after my return from Guiana, in the *Annals of Natural History*, some remarks on the urari* poison of the Indians of that territory, principally as prepared by the Macusis, who occupy the open country between the rivers of white waters, namely, the Rupununi, Takutu, and Parima, or Rio Branco. The latitudes 2° and 3° north, and the longitudes 59° and 61° west from Greenwich,† circumscribe the country over which their settlements are dispersed, comprising about 21,000 square miles.

My former observations, and the experiments which I had made with this poison, were reawakened by the perusal of some remarks in the *Journal de Pharmacie et de Chimie*.‡ which induce me to state again my opinion on the true nature of this terrible substance.

As many of the readers of the Transactions of the Pharmaceutical Society may not be acquainted with the preparation, nature, and effect of the urari, I trust it may not be considered a useless repetition to give a general outline of what I have previously stated in this regard in the *Annals of Natural History*. The active principle of this, the most dangerous of all poisons, seems still enveloped in obscurity. It has been so for centuries past. Although the first discoverers of the New World made it already known that the aborigines employed different substances to poison their arrows, the action of that poison seems to have been very different from that of the urari. Oviedo, the contemporary of Columbus, who passed many years in the New World, and had at various times occasion to see the effect of the poison, says, that the people who had been wounded became ravingly mad, biting themselves in the paroxysm of pain until death ended their sufferings.§ Herrera confirms this account, and asserts that the ingredients of the poison consist of a root which is found on the sea-shore, and has a very bad smell, of black stinging ants, as large as beetles, spiders, nasty hairy caterpillars of the size of half a finger, which sting as badly as the ants, bats' wings, the neck and head of a poisonous sea-fish called tabrino, toads, and necks of snakes, which ingredients were boiled with the fruits of the manzanilla by a male or female slave outside of the village; for the fumes which arose from these poisonous materials were so injurious, that the person who had to prepare the poison fell always a victim and died. This historian attests already, that in order to be effective, it must come in contact with the blood; if this be the case, and let the wound be as small as that inflicted by a pin, the wounded person pays it with his life. The remedy then known was to apply fire to the wound, and to keep a strict diet and be abstemious. Others pretended, in harmony with the superstitions of those times, that the fœces of the person who had been wounded should be taken inwardly in pills or otherwise.‖

Here we have, then, in all its prominent features, the account surrounded by superstition of the component parts and the preparation of the arrow poison, which, repeated by the fathers Gumilta and Gili, has become the text-book from whence many who have since written on the arrow poison have taken their account of the preparation.

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* To be pronounced as if it were written Ourahree.

† Near the Mausi village Pirara, within this district, is the site of Sir Walter Raleigh's and Keymis's supposed "El Dorado."

‡ Tome xxx., p. 148, *et seq.*

§ Oviedo, *Historia General y Natural de las Indias*, lib. ii., cap. 8. The historian relates in lib. vi., cap. 48, that in the commencement of the discovery no remedy had been known, but that a certain hidalgo, Garcia de Montalos, then residing in the island of Cabagua, dreamt he had been wounded by a poi oned arrow, and applied corrosive sublimate to the wound, with which he cured himself. On awaking he thought the dream of too great importance to pass it entirely over; and in one of the battles with the Indians, a soldier having been struck by a poisoned arrow, he applied the corrosive sublimate, and the man recovered. From this time the Spanish soldiers always carried corrosive sublimate with them whenever they had to go to war with the Caribs and other Indians that used poisoned arrows.

‖ Herrera, *Descripcion de las Indias Occidentales*, de. i., lib. cvii., cap. 16.

Sir Walter Raleigh, in his *Discovery of the Empire of Guiana*, observes: "There was nothing whereof I was more curious than to finde out the true remedies of these poisoned arrowes, for besides the mortalitie of the wound, they make the partie shot indureth the most insufferable torment in the world, and abideth a most vglie and lamentable death, sometimes dying starke mad, &c. * * * Some of the Spaniards have been cured in ordinary wounds of the common poisoned arrowes with the juice of garlike, but this is a general rule for all men that shall hereafter travell the Indies, where poisoned arrowes are used, that they must abstaine from Drinke, for if they take any licor into their body, as they shall be maruellously provoked thereunto by drought. I say if they drink before the wound be dressed or soone vpon it, there is no way with them but present death."

The interest respecting this celebrated poison, and the nature of its ingredients, was kept alive. Every traveller returning from Guiana, from the Amazon, and the Brazil, brought new accounts of its preparation and its effects; the relation still surrounded with marvels, amongst which the admixture of snakes' teeth played a great figure. At the commencement of the nineteenth century, the Nestor of scientific travellers, Baron Alexander von Humboldt, gave an authentic account of its preparation, attesting that neither snakes' teeth nor stinging ants formed any of its component parts, and that the active principle was derived from a plant, which he considered to belong to the *Strychneæ*. Von Martius, the great Brazilian traveller, attests that the chief ingredient of the arrow poison of the Indians of the Yupura, is the bark of a slender tree, which in the Tupi tongue is called Urari-riva, the *Rouhamon Guianensis* of Aublet, much allied to a plant which Mr. Bentham, in the enumeration of my Guiana plants, has called *Strychnos cogens*, which is still employed by some of the Indian tribes for the preparation of their arrow poison. Dr. Peeppig, in his *Reise in Chili, Peru, und auf dem Amazonenstrome*, observes with respect to the arrow poison of Peru:—"The supposition occasionally met with in Peru, that animal poisons were mixed in the composition, has not met any confirmation." The preparation of the urari, as practised by the Juris, Passes, Miranhas, and Ticunas,* Indian tribes of the rivers Amazon and Yupurara, was witnessed by Von Martius, who asserts that no animal substance was added to it.

Not contented with the report of the simple method of its preparation, Mr. Charles Waterton, the author of *Wanderings in South America* (a book delightful to read, vivid and animated in the descriptions of the glorious scenes which nature presents in Guiana, but devoid of scientific researches), introduced again the account given by Herrera, Gumilla, &c., reinstating snakes' teeth, stinging ants, &c. But Mr. Waterton had never been present when the poison was prepared, nor had he seen the plant in its native growth which furnishes the active principle. He reports merely what had been communicated to him in this regard by some of the crafty Indians, whose interest it was to surround the whole with mystery.

The name by which Mr. Waterton introduces this famous poison is even spurious. The Macusi Indians, the most famed tribe for the preparation of the true poison, call the plant which furnishes it Urari-ye, and the poison itself urari, which the Carabisis or Caribs, who are not able to make a proper distinction between the sound of r and l, have corrupted into Ulari and Urali, of which Mr. Waterton has made Wourali.† Raleigh had heard, during his voyage, that the Indians call a vegetable substance, with which they poison their arrows, "Ourari," and under that name it occurs again in the list of "names and rivers" as a poisonous herb.‡ Herrera mentions the word Urari,§ and it exists to this day in the name of the rivers Urari-Capara and Urari-Cuera, which at their confluence form the Rio Branco. Von Martius and Von Spix, in their *Travels in Brazil*, observe that during their exploring tours up the Amazon, Yupura, Rio Negro, &c., they heard the poison pronounced as Urari, but never Wourali.‖ It is surprising, therefore, why a

* The Macusi and Wapisiana Indians place their poison, when finished, in calabashes, as the vessels made out of the fruit of several species of *Crescentia*, after the inside has been scooped out, are called. The Indians of the Amazon, Yupura, Rio Negro, &c., put it in earthen vessels of various shapes. No Indian of Guiana would purchase the poison offered for sale in earthen vessels, knowing that in this shape it does not come from the right source.

† Waterton's *Wanderings in South America*, 4th edition, p. 46.

‡ Keymis, in *Hakluyt*, vol. iii., p. 687.

§ Dec. ii., lib. x., cap. v.

‖ *Reise in Brasilien München*, vol. iii., p. 1155.

spurious name should have been substituted in England for the true one, which Raleigh already reported in 1595 to be Ourari.

I had made myself acquainted with these facts before I commenced my exploring expeditions in the interior of Guiana, and it may be conceived that I was most anxious to become acquainted with the ingredients which formed the famous urari poison, and the plants which furnished its component parts. I was fortunate enough to accomplish my wish during the first expedition, which, under the direction of the Royal Geographical Society of London, and under the patronage of the British Government, I undertook, in 1835, to explore the interior of Guiana. The plant which Humboldt was prevented from seeing, and which was one of the chief objects of Mr. Waterton's *Wanderings*, but without success, I saw growing at its natural place in 1835.* Humboldt, with his usual sagacity, pronounced, from the mere sticks which the Indians had brought to Esmeralda for the preparation of the poison, that the plant from which they came belonged to the *Strychneæ;* and such I found it to be, although it was at that time not in flower. I have described it as *Strychnos toxifera.*†

The plant which furnishes the active principle of the urari poison having been discovered, it remained now to ascertain the mode of its preparation, and to learn what other materials are added to it. This I could only ascertain during my third expedition in 1837. The Wapisianas, but principally the Mausi Indians, are the most famed for the preparation of the urari poison. The Indians of the Orinoco itself acknowledge it, and only use the Curare, the preparation of which Humboldt witnessed at Esmeralda, when they cannot procure any of the poison made by the Macusis ; the Maiongkong, and Guinare Indians, who inhabit the northern tributaries of the upper Orinoco, undertake journeys to the country of the Macusis, merely for the purpose of bartering the urari, giving in return the Curata, that admirable reed, which is sometimes sixteen feet long without an internode, and of which the celebrated blowpipes or sarbacans are made.‡

From what I learned from the Macusis and Wapisianas, during my first expedition, they use the bark of the woody parts of the *Strychnos toxifera* and its alburnum, both of which are considered to possess the poisonous principle in the highest degree. Young shoots are not employed for that purpose. The bark, after having been stripped from the wood, is pounded and steeped in water, to which effect a new earthen vessel is employed. Here they allow it to remain for some days, well covered, until the water is of a yellowish colour, when it is filtered by means of a simple mechanical operation. Several other plants have been meanwhile procured, of which infusions are made in a similar manner, which are added to the urari at the moment it has been concentrated on a slow fire to the consistency of a thin syrup. The addition of the juices obtained from the other plants gives a darker colour and greater consistence to the urari, which, while still fluid, resembles thick tar. It is now put into small calabashes, which are covered with leaves, to prevent the poison from coming in contact with the air. If it is to be used, the quantity required is put into a calabash, and a little juice of the cassava is added, to render it more pliable. I was told that the addition of cassava-water, as the expressed juice of the root of the *Jatropha manihot* is termed, reawakens the slumbering powers of the poison, should it have lost its strength by age. After this juice has been added to it, the Indian buries the calabash with the poison for a day or two under the ground.

This is the simple account of the preparation of the urari, as practised by the Macusis and Wapisianas. There is no danger whatever in the preparation, and the vapours which are disengaged are entirely innocuous. But in the same manner as the charlatan and empiric surrounds his sovereign cure against all evils flesh is the heir of with mystery, thus the Indian, for his advantage, surrounds the preparation of this deadly poison with superstitious customs. The circumstance that it requires

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* *Journal of the Royal Geographical Society of London*, vol. vi., p. 251.

† See Hook., *Ic. Pl.*, t. 364 and 365. My brother, Richard Schomburgk, has been successful to meet the plant in flower on the river Surura, a tributary of the Pomeroon.

‡ This remarkable reed, it seems, is only to be found in the mountains of Mashiatti, Marawacca, and Wanaga, on the rivers Ventuari, Paramu, and Orinoco. I was so fortunate as to be the first botanist who saw it in its natural locality, and Mr. Bennett has been so good as to describe it under the name of *Arundinaria Schomburgkii.* (See *Annals of Natural History*, vol. v., p. 44.)

several days to watch the pot closely on the fire, taking off the scum before it is properly concentrated, prevents the Indian, with his natural indolence, from preparing the poison more than once or twice a year.

During my third expedition in 1837, while at Pirara, the Macusi village, which, as already observed, is the classical soil of Raleigh's and Keymis's *El Dorado*, I ascertained that an Indian lived in the vicinity who was far-famed for the preparation of the urari poison; and having won him by a handsome present, he promised to prepare it in my presence. I accompanied him myself to the Canuku mountains, a journey of two days, to be present, for surety sake, at the gathering of the plant, the *Strychnos toxifera*, the bark of which was stripped, and preserved in small baskets made for that purpose. I took possession, as my share, of three of these baskets, which I carried with me to Pirara, but when the appointed day for commencing the preparation had arrived, the Macusi, prevailed upon by one of the chiefs of his tribe, refused to comply with his promise. I was then so near my departure for Fort San Joaquim, on the Rio Branco, that I was prevented from engaging a more willing concocter, and with the pure bark, gathered in my presence, in my possession, I left for my destination. It was during my stay at that fort that I resolved to make some experiments *how far the pure bark of the urari plant* (Strychnos toxifera), *unmixed with any other substance, might prove fatal to animal life.* I took, therefore, two pounds of the bark shavings, pounded them, and having poured a gallon of water on the mass, allowed it to remain in that state for twenty-four hours. Half of it was filtered off, and keeping a steady but gentle coal fire, it was boiled in a new pot, adding from time to time more of the infusion. After having concentrated it by boiling to the consistence of very thin syrup, and having allowed it to cool, two arrows were poisoned with this substance, with which two fowls were slightly wounded, one in the thigh and the other in the neck. The effects became apparent after five minutes—the first died in twenty-seven minutes after the wound had been inflicted, and the other, which had been wounded in the neck, after twenty-eight.

The gentlemen who accompanied me on my expedition,* and Senhor Pedro Ayres, a scientific person who had been sent by the commander of the district to welcome me at the Brazilian boundary, were present during these experiments, which established beyond doubt *that the pure concentrated juice of the urari plant alone, without any assistance of Indian charlatanism or the addition of extraneous substances, proves fatal to animal life, if its juice, thus concentrated, be brought in contact with the blood.*

The boiling process was finished in less than seven hours, while the Indians employ more than forty-eight hours for that purpose; and as it required a period rather longer to produce death in the fowls wounded with it than would have been necessary with good urari, this must be ascribed to my decoction not being sufficiently concentrated. The poison which I had thus prepared was of a yellow-brownish colour—good Macusi poison is greenish-black, or even jet black; and I have no doubt that it receives this appearance from one of the ingredients which the Indians add to it.

When I left Pirara, foiled in my purpose to see the poison prepared by the Macusi, I arranged with the late Rev. Thomas Youd, who laboured then as missionary of the Episcopalian church in that village, to try if he could induce this famed poison-maker to boil it in his presence, in which he fully succeeded, and he had the goodness to communicate the result to me in a letter, which is printed *in extenso* in my paper on the urari in the *Annals of Natural History*, vol. vii., p. 416. It is the most authentic document of the manner in which the poison is prepared, for I have since witnessed its manufacture myself. Snakes' teeth, stinging ants, or any other animal matter, are not added to the mass. The urari bark alone is the ingredient which gives the active principle, and the other additions probably the consistence and colour. The herbs, the juice of which is added to the true urari bark, were, as far as I was able to ascertain their botanical character, *Strychnos cogens*, Benth., a species of *Cissus*, a plant belonging to the family of *Xanthoxylaceæ*, but the rest I could not recognize. The *cissus* no doubt contributes to give consistence to the concoction. It deserves the passing remark, that all the ingredients which the Macusi use (excepting the *Cissus*) for the preparation of their poison are of an intense bitter.

* Amongst whom was Mr. John Morrison, as artist (who occupied recently the post as mayor of George Town, in Demerara); Mr. Vieth, as assistant naturalist; and Mr. Le Breton, to look after the commissariat.

The sagacity of the Macusi to try whether the poison he has prepared is of the strength he desires, by wounding a lizard, a cold-blooded animal,* shows much more philosophy than as related by Father Gumilla, that an Indian wounds himself slightly, and an arrow dipped in the poison is held near the wound. If it make the blood return to the vessels, although not brought into contact with it, the poison is considered to be of sufficient strength. The absurdity of such an experiment requires no comment; on the contrary, the experiment of the Indian is sagacious, for he believes that the urari has less effect upon cold-blooded animals than upon those with warm blood. Its effect is more or less sudden upon different animals, and the Indians say that monkeys and jaguars are more easily killed with it than any other animal. If it has a sudden effect upon a cold-blooded animal, for example, upon a lizard, a frog, or a snake, the preparation, as I have already mentioned, is considered excellent, and against such poison the Indians say there is no remedy. Salt and sugar are considered antidotes against weak poison, but will avail nothing where the poison is strong. It has been related to me, that when wounded in wars, and salt is not to be had, the Indian resorts to urine. The thirst which follows is described as almost intolerable, and certain death ensues if the thirst is quenched with water, for, the more the wounded person drinks, the greater becomes his thirst. This agrees with what Raleigh observed in this respect nearly two centuries and a half ago.

According to the researches of M. Alvaro Reynoso, chlorine and bromine neutralize the effect of the poison completely; and iodine, azotic acid, and potassa, alter it without destroying completely its effect.† If this discovery be confirmed by experiments with the best Macusi poison, which I do not think M. Reynoso employed, it will be an invaluable discovery.

I have endeavoured in the preceding remarks to give a general outline of what was known of the famous arrow poison, when I published my remarks in the *Annals of Natural History*, establishing at that time, without contradiction, by my experiments at Fort San Joaquim, that the principle which destroys animal life by urari is derived from the *Strychnos toxifera*, and that the poison, prepared by the Macusis, which is considered the best and strongest in South America, does not contain snakes' teeth, stinging ants, or any other animal substance.

My brother, Richard Schomburgk, who accompanied me in my travels during 1840 to 1844, at the command of the King of Prussia (the Prussian Government having previously obtained the permission from Her Britannic Majesty's Government), had in 1842 the opportunity of witnessing the preparation of the poison by the same individual who was to make it in my presence, ultimately refusing to do so, but who was more complacent to the missionary, Mr. Youd. The process, as described by my brother,‡ is identical with that mentioned in the letter of Mr. Youd, dated the 4th of October, 1838, which I have added as a valuable document to my remarks on the urari poison in the *Annals of Natural History*.§

On his return to Berlin, he took with him some of the poison which had been prepared in his presence, which Dr. Heintz, of Berlin, has analysed.

The difficulties of this process, as regards vegetable substances, and the patience requisite to perform it with accuracy, are too well known. I have given samples of the true Macusi urari to some of the first chemists of our day, but it seems all shrunk from the labour, or really found difficulties which deterred them to continue the process. Dr. Heintz did not meet with perfect success. It is the most recent analysis of the urari poison, proving, like Boussingault's, the absence of strychnine and of animal substances. Dr. Heintz did not succeed in discovering the alkaloid which MM. Boussingault and Roulin have called curarine, and which MM. Pelletier and Petroz assert they have likewise obtained by a process which differs from that of the chemists just before named.‖

Some very valuable experiments respecting the effects of the poison were made

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* Compare Mr. Youd's letter in the *Annals of Natural History*, vol. vii., p. 418.

† *Journal de Pharmacie et de Chimie*, tome xxx., p. 151. See likewise *Traité de Chimie Générale*, par Pelouze et Freny, vol. iv., p. 452.

‡ *Reisen in Brittish Guiona in den Jahren* 1840—1844, *im Auftrag Sr. Majestät des Königs von Preussen, ausgeführt von Richard Schomburgk.* Leipzig, 1847. T. i., p. 4.

§ *L. c.*, vol. vii., p. 416.

‖ *Traité de Chimie Générale*, par Pelouze et Freny, vol. iv., p. 451. *Traité de Chimie Organique*, par Liebig. Edition française, par Gerhardt, p. 365.

by Dr. Virchow and Dr. Münter, a statement of which is added in a note to my brother's work.

The most important result of these experiments is the observation that animals killed by urari show no difference in the appearance of the vital organs on dissection from those which were killed by mechanical means.

With the knowledge of the foregoing facts before me, I have been rather astonished to see the old account of snakes' teeth, &c., renewed in an article, entitled "*Recherches sur le Curare*," which, according to the *Journal de Pharmacie et de Chimie* (tome xix., p. 36), has been read at the Academie des Sciences, by M. Cl. Bernard, in his name, and in that of M. Pelouze.

These gentlemen assert, furthermore, that notwithstanding this poison had been known for such a length of time, no precise notice existed of the nature of the ingredients which entered into its composition.

I thought that the experiments which I had made at Fort San Joaquim would at least have set the question of the source of the active principle at rest.

MM. Cl. Bernard and Pelouze, on opening the animals poisoned by the curare, with which they experimented, found the blood always black, difficult to coagulate, and no longer "rutilant," by coming in contact with the air.

These observations, as far as it regards the state of the blood of animals killed by the curare, are entirely opposed to those of Virchow and Münter, who expressly state that after empoisonment with urari, the coagulation of the blood occurs just in the same manner as in animals killed by mechanical means. On dissecting a rabbit killed with urari, at the moment that the beating of the heart was no longer sensible, it showed nowhere any accumulation of blood, neither in the smaller nor in the larger veins.

The blood procured from the heart itself was quite fluid, without change in its colour, coagulating in a few minutes, just like the blood from slaughtered animals.

These appearances are perfectly in accordance with the investigations which were carried on, as stated in the *Annals of Natural History* (l. c., p. 423), by Dr. Franz, Mr. Sewell, the well-known veterinary surgeon of London, and Mr. Desenis of Berlin. The healthy appearance of the vital organs and of the blood after the empoisonment, induced me to observe, that with regard to medical jurisprudence this poison proved to be the more dangerous, as, should it be employed for sinister purposes by man against his fellow-creature, it would be difficult to state at a *post-mortem* examination the real cause of death. In some of the rabbits on which I tried experiments while in London, Dr. Franz found rather a larger quantity of blood in the brain and the spinal cord than usual.

MM. Bernard and Pelouze make the very important observation, that having applied the poison to the pulmonary mucous membrane, it had the same effect by absorption as if it had been brought in contact by incision with the cellular tissue.

Does this not agree with the observation made by Virchow and Münter, that death occurs not so much as a direct result of the empoisonment, but as the consequence of the interrupted respiratory movement?

The *Journal de Pharmacie et de Chimie* for August last contains a report by M. Reveil, to the Société de Pharmacie of Paris, of the Pharmaceutical Substances at the Universal Exhibition. M. Reveil makes some further interesting observations on the arrow poison; nevertheless, they are mixed with the old superstitious accounts of its preparation and effect. M. Reveil quotes the statement of M. Boussingault, made before the Académie des Sciences, that the curare which he brought with him from the Amazon did not contain any snake poison.

He repeats former observations, that the action of the curare had great analogy with the venom of snakes; for example, it might be taken innocuously into the stomach, but in other points it differed from it, for the curare did not produce an inflammation of the wound, which, if caused by snake poison, produces almost instantaneously considerable inflammation.

His statement that the curare may be taken inwardly, or received in the stomach without danger, has hitherto been the adopted opinion. I have mentioned already, in the *Annals of Natural History*,* that, while suffering under a tertian ague, during my first expedition in the interior of Guiana, and our quinine having fallen short, I took the urari poison in small doses inwardly. Humboldt relates that the Indians

* *L. c.*, vol. vii., p. 425.

considered it an excellent stomachic,* but as I found that it did not remove my fever, and my friend and travelling companion, the late Capt. Haining, having warned me repeatedly against this practice, I desisted.

Some years afterwards my brother, Otto Schomburgk, made at Berlin several experiments with the urari poison. Amongst others was the following: He administered to two cats the urari in like quantities, to the first by incision, to the other inwardly by the mouth; to a third he applied by incision a like quantity of strychnia. The convulsions caused by having placed the urari to the incised wound, stood not in comparison to the tetanus and trismus produced by the strychnia. The former exhibited much more a gradually falling asleep than violent convulsive affections.

The cat, in the wound of which urari poison had been introduced, died after eleven minutes; the other, poisoned by strychnia, after twelve minutes; and the one to which the poison had been administered inwardly, in seventeen minutes.

The death of the latter took place under the same symptoms as produced by bringing the poison in contact with the blood. On dissecting the animal, the stomach and the duodenum were found in their whole extent coloured with the poison. He could not discover a wound in either of the organs conducting to the stomach, or in that part itself.†

In order to substantiate the result, which my brother obtained by giving the poison inwardly, it requires numerous repetitions.

The cat may have had some excoriation, if not exactly a wound, by which the blood came in contact with the poison. It is, however, sufficient to caution against the internal use of urari in its concentrated state. But it is well known that with such poison, more or less weakened, the Indians mostly kill their game. This refers to the thick-skinned tapir, to the fleet deer, the agile monkey, as well as to the largest or the smallest bird. Even the wild cattle which roam over the savannahs of Pirara and Fort San Joaquim are secured in that way. Without that, the meat of the animals thus killed prove injurious to those who partake of it. On the contrary, the employment of urari in killing the animal renders the meat more tender; and following the example of Father Zea, the missionary who accompanied Humboldt up the Orinoco, we killed, during the Guiana expedition, the fowls which we purchased from the Indians, and which usually were uncommonly tough, by means of a poisoned arrow, rendering thereby the flesh more tender.

I must not omit to mention the experiments made by Mr. Sewell, who, viewing the lock-jaw in horses as the result of irritation, conjectured that if a horse in tetanus were poisoned by urari, which acts by suppressing nervous power, and life was then to be restored by artificial respiration, the nervous system, on reanimation taking place, might possibly be free of the original morbid irritation. Reasoning thus, Mr. Sewell tried the following experiment:—A horse suffering from tetanus and lock-jaw, the mouth being too firmly closed to admit the introduction of either food or medicine, was inoculated on the fleshy part of the shoulder with an arrow-point coated with urari poison. In ten minutes apparent death was produced. Artificial respiration was immediately commenced, and kept up for four hours, when reanimation took place; the animal rose up, apparently perfectly recovered, and eagerly partook of hay and corn. He unluckily was too abundantly supplied with food during the night. The consequence was, over-distention of stomach, of which the animal died the following day, without, however, having the slightest recurrence of tetanic symptoms.‡

Mr. Waterton conjectured that the application of urari poison might prove successful in cases of hydrophobia. However, the experiments of recovering animals which had been killed with urari by tracheotomy, have not always succeeded; indeed, only in the smaller number of cases.

It is therefore evident that the urari, in the present state of our knowledge of its

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* *Personal Narrative*, vol. v., part ii., p. 522.

† Richard Schomburgk's *Reisen*, vol. i., p. 456.

‡ I refer, likewise, to the interesting experiments carried on by Mr. Sewell, to recover, by artificial respiration, or tracheotomy, an ass which had been wounded with a poisoned spike. Mr. Waterton took the animal afterwards to Walton Hall, his seat, where, well cared for, it survived the operation twenty-five years. See Waterton's *Essays on Natural History*, 3rd edition, p. 304.

effects, could only be resorted to in the greatest extremity as a remedy against hydrophobia, and under all circumstances, only where there is no other hope of recovery.

It becomes, however, now a question of the greatest importance to society, should that dangerous poison be employed for criminal purposes, how is it to be discovered that such was employed ? The wound by which good urari is communicated to the blood shows no inflammation; nor is it necessary that it should be a large flesh-wound, an arrow with the finest point, or a needle coated with concentrated poison may be sufficient to destroy life.

How startling is the assertion of Dr. Heintz, that three milligrammes of the poisonous extractive matter which he obtained killed a rabbit in seven minutes !

Under such an aspect it is certainly of the greatest importance that our best chemists should institute a more searching inquiry into the nature of the urari, how its application may be discovered and its effects counteracted.

The assertion of Mr. Reynoso, that chlorine and bromine are antidotes, ought to be tested by a series of experiments, not only with the best urari poison, but likewise by extracts obtained by scientific means from the bark of the *Strychnos toxifera* and other species of plants belonging to that genus.

So many years have elapsed since I left British Guiana, that I scarcely know to whom to apply to procure good Macusi urari, but I am persuaded, if those who wish to occupy themselves with such an interesting research, were to address themselves to the Royal Agricultural and Commercial Society of British Guiana, or to Dr. Blair or Dr. Dalton at Demerara, their application would be successful, and that useful institution, or the scientific gentlemen just named, would exert themselves to procure the true Macusi poison.

I mention it as of great importance to obtain, at the same time, the pure bark of the *Strychnos toxifera*, in order to ascertain, by scientific investigations in Europe, the active principle, which I am persuaded is contained in the *Strychnos toxifera* in the highest degree, though other species of that genus may possess it more or less.

"A fine chemical and physiological investigation remains to be accomplished in Europe on the toxiques of the New World," stated Humboldt forty years ago. Unfortunately but little advance has since been made in that direction, and the same important desideratum remains still to be accomplished.

Santo Domingo, January 20th, 1857.

Dr. De Vry mentioned some experiments he had made with the urari poison, from which he concluded that it did not act as a poison when introduced into the stomach. He had reason to believe that it became inert after being long kept.

Mr. Squire described a case in which almost instant death was produced in a rabbit by wounding it with an arrow charged with the poison.

Dr. De Vry exhibited to the meeting an interesting collection of specimens of the alkaloids of the cinchona barks, together with their compounds and some of their derivatives.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, March 11th*, 1857.

DANIEL HANBURY, F.L.S., IN THE CHAIR.

Donations of plants were announced from Mr. Henry Groves, of Weymouth; and also from Mr. E. Wood, of Brighton.

The following paper was then read:—

ON THE FOSSIL VEGETATION OF THE COAL MEASURES.

BY MR. T. GREENISH.

The author commenced by referring to numerous specimens, for which he was indebted to Mr. Woolven, of the fossil remains of calamites, lepidodendron, sigillaria, stigmaria, and some beautifully marked ferns, which were found imbedded in the sandstone and shale which constitute the roof and floor of our coal seams.

The author proceeded to state, these fossil remains serve as a means of illustrating

the history of early vegetable life, and also the probable condition of climate which prevailed at that remote period, and favoured so luxurious a growth.

It is in the coal formation chiefly that the remains of plants have been preserved; deposited under conditions which prevented the usual process of decay, they have lain buried in beds of sand and mud, since become sandstone and shale.

If, from the fossil remains, which still retain the parent form, we were to arrive at the conclusion that they represent the plants which have contributed most to the formation of coal, we should most probably be in error. It by no means follows that the centre of a coal seam is composed of the same vegetation as that on which it lies, or by which it is covered, as indicated in the remains before us, other plants and those of a more delicate character, whose organization was incapable of withstanding the decomposing influences to which they were subjected, have, there can be little doubt, materially contributed to this formation.

In the bituminous shale we have the beautifully marked ferns in great abundance, many of them are now on the table, yet it is a question if they have furnished much material for the formation of coal.

Dr. Buckland states that the value to be attached to *numerical* proportions of fossil plants, in estimating the entire condition of the flora of these early periods, has been diminished by the result of some interesting experiments on the *durability* of plants immersed in water for a period of two years.

1. That the leaves and bark of most dicotyledonous plants are wholly decomposed in two years; the greater part of those which resist it are *coniferæ* and *cycadeæ*.

2. That monocotyledons are more capable of resisting the action of water, particularly palm and scitamineous plants, but the grasses and sedges perish.

3. That fungi, mosses, and all the lowest forms of vegetation disappear.

4. That ferns have a great power of resisting water if gathered in a green state, not one of those submitted to the experiment having disappeared, but that their *fructification* perished.

The general absence of structure in the interior of these large fossil remains of the coal formation implies the very durable nature of their bark as compared with the internal portion.

This fossil vegetation is found in all stages of transformation. Here is one of the sigillaria with a coating of friable coal, which has replaced the bark, while that portion immediately beneath still retains the form of the particular plant.

One of the specimens has several pieces of iron pyrites attached to it. This mineral is frequently found in the coal measures, either incrusting fossil shells, or as a coating on vegetable impressions in shale; its formation is at the cost of organic remains.

As regards the climate of this period, it is a generally received opinion that a tropical heat must have prevailed; but there are those who doubt it, finding it difficult to reconcile the preservation of so much vegetable matter with a high temperature. There is no doubt but that organic substances under water undergo oxidation by the absorbed atmospheric oxygen, and that it may go on at very great depths; yet it is undoubtedly the fact, that decomposition goes on more slowly the deeper they are below the surface, owing probably to the slower replacement at those depths of the oxygen consumed in their decay, and decomposition may assume different characters according as it takes place in water of greater or less depth.

"The great predominance of ferns would indicate moisture, and we know too little of the sigillaria, calamites, and other ferns peculiar to the carboniferous period to be able to speculate with confidence on the kind of climate they may have required."

Having now glanced at the fossil remains which, imbedded in clay or bituminous shale, lie upon and underneath the great body of coal, I shall reserve for a future occasion the consideration of those plants of which probably the coal is composed, until I again visit the coal district of Ashton-under-Lyne, when I trust an opportunity will be afforded me of personally obtaining the specimens necessary to illustrate the subject, when I shall have much pleasure in bringing it again before you.

The next meeting of the Club will be held on Wednesday, April 8th, 1857, at half-past eight P.M., when an account of a botanical excursion to Lulworth, near Weymouth, by Mr. H. Groves, will be read and illustrated by specimens.

The Committee beg to direct attention to the following genera, of which the

herbarium of reference is deficient. The Committee would be happy to give plants in exchange for any of the genus mentioned below :—

Thalictrum, Myosurus, Eranthis, Aquilegia, Aconitum, Pæonia, Nuphar, Papaver, Crambe, Isatis, Capsella, Hutchinsia, Cochlearia, Subularia, Camelina, Alyssum, Arabis, Barbarea, Sisymbrium, Cheiranthus, Hesperis, Brassica, Lychnis, Moenchia, Sagina, Honckeneja, Holosteum, Cerastium, Cherleria, Althæa, Lavatera, Spartium, Ulex, Medicago, Trigonella, Oxytropis, Arthrolobium, Onobrychis, Sibbaldia, Fragaria, Rubus, Rosa, Mespilus, Cratægus, Pyrus, Epilobium, Isnardia, Montia, Hydrocotyle, Astrantia, Physopermum, Smyrnium, Cicuta, Apium, Petroselinum, Trinia, Sison, Œgopodium, Carum, Fœniculum, Seseli, Ligusticum, Silaus, Meum, Crithmum, Angelica, Peucedanum, Tordylium, Caucalis, Scandix, Anthriscus, Coriandum, Lonicera Linnaea, Rubia, Centranthus, Tragopogon, Helminthia, Picris, Thrincia, Apargia, Hypochœris, Lactuca, Sonchus, Mulgedium, Borkhausia, Taraxicum, Saussurea, Chrysocoma, Aster, Cineraria, Bellis, Matricaria, Wahlenbergia, Azalea, Andromeda, Arbutus.

The remainder of the list will appear next month.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 26th February, 1857.

MR. H. S. EVANS, VICE-PRESIDENT, IN THE CHAIR.

Mr. Newton Samuelson, F.C.S., read the paper for the evening :—

ON THE PRODUCTION OF COPPER FROM ITS ORES.—PREPARATION AND USES OF SALTS OF COPPER EMPLOYED IN THE ARTS AND SCIENCES.—THE MODES OF ASSAYING COPPER ORES IN THE DRY WAY, AS WELL AS BY HUMID ANALYSIS.

After giving a short history of the metal, the lecturer proceeded to describe the various methods by which it is derived from the ore; exhibiting and explaining large drawings of the smelting furnaces used for that purpose. He then passed on to the salts of copper, viz., sulphate, or blue vitriol; carbonate, or verditer; arseniates (Scheele's and Schweinfurth's green), and the various acetates; explaining their manufacture, the sources from whence they are taken, and their uses. After this the alloys of copper were touched upon by Mr. Samuelson, namely, brass, German silver, bronzes, &c.; and, lastly, he described, at considerable length, the means used by assayers and analytical chemists to test the strength of copper ores, both by smelting and by humid analysis. This part of his subject Mr. Samuelson rendered remarkably clear by practical experiments, showing, without the slightest reserve, the means which he himself employed in ascertaining the strength and quality of copper ores.

At the close of the lecture a long discussion ensued on several of the points touched upon, and a vote of thanks was accorded to Mr. Samuelson for his highly interesting communication.

Thursday, 12*th March,* 1857.

MR. ABRAHAM, THE PRESIDENT, IN THE CHAIR.

Mr. E. G. Heaton was elected a Member of the Society.

The Secretary announced donations to the Museum from Messrs. R. Sumner and Co., and Mr. W. H. Samuel.

A paper, of which the following is an abstract, was then read by Mr. Thos. Lowe,

ON THE SALE OF POISONS.

He commenced by stating that, after an attentive consideration of all the *pros* and *cons* that had hitherto appeared on the subject, he had come to the conclusion that legislative interference with the sale of poisons both had done good, and would, if extended, do more good, provided it were not too stringent. But though advocating the extension in principle of the Arsenic Act to such substances as strychnia, prussic acid, and a number of other poisons, including specially oil of vitriol and

laudanum, and adding thereto a system of certificates and licenses, he repudiated the idea of throwing the whole burden of trouble and responsibility upon the Medical Profession; his brethren, he was sure, would take a fair share of both. He urged, that to confine legislation to the prevention of criminal poisoning, as some would do, was, if not useless, beginning at the wrong end. *Accident* by poison was what we ought to strive to prevent, and, in so doing, we should lessen the number of those criminal attempts which were meant to be sheltered under the appearance of accident. It was so in all analogous legislation. Who ever heard, that in ordering dangerous machinery to be fenced off, or a bridge to be walled, it was done in order that a man might not force his neighbour over the barrier? What interest had the Pharmaceutist in opposing such a scheme? None that he could see: for it was notorious that cases of mistake in which blame could be justly imputed to the Chemist were very few indeed. The careful Chemist habitually complied already with most of the provisoes of such an enactment as he proposed, and would scarcely be made aware in his practice of its having passed the Legislature, whilst it would be a wholesome terror to the careless; and of those who might be so called, few, if any, properly belonged to the Pharmaceutical body. He said this with confidence. The more you "figured" and studied statistics, the greater—in this age of "free trade," in poisons especially—the marvel grew, that instances of carelessness and error in a class so numerous were so extremely rare. But in admitting and glorying in this, he had not said that cases of *poisoning* were so few. In England they averaged over five hundred deaths per annum judicially cognized. How many instances falling short of death, or of undiscovered deaths, there were, it would be vain to conjecture. It was mistakes of all kinds, and wherever occurring, that he aimed to prevent by legislation. (Having answered at length the question, Why legislate for *poisons*, when you don't dream of such a thing in the case of knives and razors, ropes, pistols, &c., Mr. L. proceeded). Here you do not aggravate the mischief, and set a premium, as it were, on other modes of destruction; for the man who employs poison, is the wretch who dares not use the knife or the bludgeon. Take poison from him, and he is, probably, weaponless. Passing over as dangerous, and therefore useless, all reliance upon variously-shaped bottles and coloured labels, and coinciding in the opinion that no available definition of a poison could be given, the lecturer proceeded to unfold his plan, which, whether effected by enlarging the powers of the Pharmaceutical Society to the extent required, as he would prefer it should be, or otherwise, was this:—He would publish alongside of the Pharmacopœia, and like it, to be from time to time revised, a kind of national "Toxicopœia," in the shape of a schedule of poisons, with instructions, &c., bearing a somewhat similar relationship to the domestic offices that the former does to the sick-room. Take the following as samples of "formulæ" for promiscuous sale to servants, &c., for common cleaning and other purposes:—Sulphuric acid, Oj.; Water, Oiv. or Ov. To be called "Vitriolic" Acid:—℞ Acid. Oxalic, q. p.; Aquæ ad solutionem; Ess. Odorif. ad "Methyl"-ationem; but in English, of course. As oil of vitriol is never used except diluted, nor oxalic acid except dissolved, what hinders their being diluted and dissolved, and only so kept for such purposes? Oxalate of potass he would forbid to be called in print "Salt of Lemons," and he would scent it. Almond flavour should have a defined strength. A label of "Poison" should be invariably affixed, and no liquid amongst the number be sent out in a cup or open vessel.

Of such a schedule as this, he proposed to classify the "Materia Toxicaria" thus: Poisons to be sold only in the presence of witnesses, and these to be required only when the article is asked for on the plea of being wanted to poison vermin or other animals. Poisons to require the presenting a certificate, each separate time of demand; and poisons to require one once only, as a general rule. He also divided the certifiers into classes. All duly qualified medical men, veterinary surgeons, scientific professors, and the whole body of wholesale, manufacturing, and retail Chemists and Druggists, duly licensed and registered, to compose the first. The second to comprise manufacturers, dyers, &c., to be privileged to recommend each other for the supply of chemicals used by them, in not less than certain defined quantities. And, third, all respectable householders, known to the supplying Chemist. These conditions, with one exception, to apply to strangers only.

Under such a system as this, even though uninvested with a shred of power in the Executive to enforce its strict observance, he maintained that, from the influence of public opinion acting upon the applicant for poison, and from the moral force of

law upon the conscience of the vendor, a great and immediate change for the better would be effected. How else is it that the Pharmacopœia is observed? Who enforces strict adherence to it? No difficulty whatever would be experienced in obtaining poisonous articles for experimental, scientific, manufacturing, or trading purposes. The only doubt of success was in reference to laudanum, solutions of morphia, and a few other medicines; and surely by allowing—even to perfect strangers—a range of latitude vastly wider than the elective franchise, this difficulty was in great part met, if not entirely overcome. The Druggist should file the certificates, and in ninety-nine cases out of a hundred he would only require to be reminded of having done so.

Mr. L. likewise pointed out and dwelt upon numerous other beneficial results, as he considered them, as likely, if not certain, to arise.

An interesting discussion followed the reading of the paper, in which the Chairman, Mr. Mackinlay, Dr. Edwards, Mr. Mercer, and other members took part. The general feeling seemed to be, that, although an extension of the Arsenic Act might be beneficial, the best safeguard for the public is the proper qualification of the persons who deal in poisons, and the intelligence and discretion they exercise in selling them.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE AMOMA OF WESTERN AFRICA.

BY W. F. DANIELL, M.D., F.L.S.,
Honorary Member of the Pharmaceutical Society.

(*Concluded from page* 472.)

4. Amomum *Danielli*. Hook. fil.

(*The Yellow Amomum.*)

A. Danielli. *Hook. fil. in Journ. Bot., v.* iv., *p.* 129, *tab.* 5 (*sub. nom.* A. Afzelii).

A. Danielli. *Hook.* (v. β. purpureum) *Bot. Mag., t.* 4764.

Bastard Melligetta. *Pereira, El. Materia Med. ed.*, 3*rd, vol.* 2, *p.* 1138, *fig.* 250, 251, 252.

Guibourt, Hist. Nat. des Drogues Simples, t. 2, *p.* 220, *fig.* 121.

Zingiber Meleguetta. *Gærtner de fruct., v.* 1, *p.* 34, *t.* 12, *fig.* 1. (?)

Fructus Cajeputi. *Trew, Commercium literarium*, 1737, *tab.* 2, *fig.* 5, 6, 7, 8, *p.* 164. (?)

Var. β. purpureum. *Labellum* angustum, pendulum. Flore purpureo, anthera apice truncata. *Hook. fil., in Journ. Bot., vol.* vi., *p.* 294. This variety was cultivated at Kew from seeds gathered at Fernando Po, or St. Thomas's islands. The plant had golden yellow flowers, which appear, however, to become changed by artificial culture into red purplish, with yellow on the lip and filament. It differs only from the ordinary species by the apex of the anther being truncated.*

This *Amomum* is very common in many of the maritime and inland districts of Western Africa. It is mentioned by Afzelius, in his report on the natural productions of Sierra Leone, under the name of *Massa-aba*, with the remark that the seeds resembled those of *Mabubu*, but were smaller; and that the pulp, when fresh, was of a fine acid. No description of this plant has been given in his *Remedia Guineensia*. It is extensively diffused throughout the peninsula of Sierra Leone, and is equally abundant in several of the circumjacent countries. A few varieties are also to be met with on the Gold and Slave Coasts, in Old Calabar, Camaroons and Gaboon rivers, on the islands of Fernando Po, Prince's, and St. Thomas's, in the Gulf of Guinea, and in other coastal districts southward of the equator.

* Vide *Pharm. Journ.*, vol. xii., p. 72.

The characteristic yellow flowers, with their orchidaceous aspect, will alone suffice to distinguish this from the other African *Amoma*. The Timneh populations designate it *Massa-aba*, and the natives of Yorruba by that of *Obro-wawa*, or *corn-leaved Obro*, from the leaves being considered to resemble those of the *Zea Mays*, L. The plant differs more or less in development according to the elevation at which it exists. In mountainous localities the reduction in size is considerable, when contrasted with the same plant when flourishing in a swampy situation. In the former the stems are thin and slender, and barely attain four or five feet in altitude. The lanceolate-acuminate leaves are not so broad, of a paler green, and proportionately restricted in growth. The flowers are smaller, less crisp, but preserve their color and other distinctive characters. The fruit, produced in numerous clusters on short aggregate scapes, is variable in size and superficially furrowed by 12—14 longitudinal depressions which deepen near the apex. The capsules about 2—2½ inches long, 6—8 lines broad, are oblong ovate, striated, obtusely triangular, and when dry somewhat arched and of an orange or ruddy brown color. The seeds are deep brown, ovate or spheroidal, polished with a small prominent yellow scar or hilum. They afford a weak camphoraceous flavor, but are more frequently, tasteless (figs. 7 and 8).

Fig. 7. Fig. 8.

Amomum Danielli. (Alpine variety. Fruits of natural size.)

(Dried capsule, and seeds of ditto.)

In the latter, or Fernando Po variety, the stem exceeds an inch in thickness and ten or twelve feet in elevation, while the leaves, very distinctly striated by nerves, sometimes exceed two feet in length, and are proportionately broad. The scape is also considerably longer. The fruit is round or broadly ovate prior to exsiccation, has a plumper outline, being much greater in magnitude, and less ribbed. The capsule when dry is about three to five inches in height, becomes slightly triangular, narrow and tapering (owing to the dissipation of its fluid contents), and the apex terminated by a cup-like expansion, the remains of the calyx. The seeds not constant in size, average two lines long and a line broad, are oblong-cylindrical, or obovate, dark brown highly polished, occasionally curved, and like those of the other African *Amoma*, are enclosed in a fine membrane from the pulp, which is pleasantly acidulous. They are endowed with a peculiar terebinthinate taste, variable in pungency. The flowers golden yellow, are firm, crisp, and emit a delicate fragrance. They appear in May and June. The aborigines of Fernando Po affirm that only two *Amomums* abound on the island, viz., the *Tokolo m'pomah* (*A. Granum Paradisi*), and this species termed

Barsalo, the latter of which flourishes so abundantly on the Kroo suburb of Clarence and on the mountain acclivities, as to form in some places almost impassable thickets. Whether the natives comprehend under their designation of *Barsalo* other scitamineous plants, I am unable to state.

In the Islands of Prince's and St. Thomas's these fruits are sold in the markets, and are known by the name of *Uçame* or *Ussahme*. At St. Anna de Chaves, the capital of the latter, I purchased several hundred for a few pence. These capsules were, however, much broader, triangular, and partially resembled those of the *Amomum Clusii*, Sm. Their terebinthinate flavor was also stronger, but in other respects appeared to be in conformity with the preceding. As this species is said to flourish in the Gaboon and Corisco rivers, it may probably be the same to which Bowdich thus makes allusion: "A beautiful red pod, the blossom of which was out of season, contains small black seeds, in taste exactly resembling the cardamom. The natives of this place (Gaboon) and also of the interior, are very fond of them. In Booroom the plant is called *Booroomum*, at Gaboon, *Entoöndo*."*

An examination of the fruits of the *A. Clusii*, Sm., in the museum of the late Dr. Pereira, lead me to suspect that they are the produce of some species either from oriental Africa or Madagascar. The capsule is rounder, deeply striated, more coriaceous, with thicker walls, and a less tapering or elongated point, and of a deep red color, characters which do not well agree with *A. Danielli*, although the seeds are nearly alike. So far as my experience extends, no fruit similar to the *A. Clusii* has been found in Western Africa.

The shape of the capsule and seeds of Trew's, "*fructus Cajeputi*" indicate some affinity to one of these species; it is, however, not improbable, that they belong to an East African or Indian plant at present undetermined. They certainly are not identical with the *A. Macrospermum*, Sm., nor yet with the "*Banda cardamom*" of Martius.

By the negro races of Guinea the pulp of the *A. Danielli* is eaten with avidity, for the agreeable acid it contains, the refrigerant qualities of which are used to mitigate the thirst from fever and other causes. The women and children of the Timneh and Soosu countries often wander in the woods in search of the ripe capsules, both for edible purposes and as an ingredient for some of their medicinal decoctions. The roots and entire plant also comprise one, among other substances resorted to in the treatment of diseases. I have found several of these pulps when broken up and placed in a jar of water, impart a grateful acidity to the fluid, which appears to be better adapted for an ordinary beverage in endemic maladies, than the lemonade made from lime-juice and sugar, which is apt to disorder the stomach and bowels.

5. Amomum *Palustre*. Afzelius.

(*The Swamp or water Amomum.*)

A. Palustre. *Afzelius. Stirpium in Guinea Medicinalium*, No. 1, p. 9.
A. Strobilaceum. *Smith in Rees' Cycl. vol.* 39, *addenda.*
A. Cereum. *Hook. fil.* (flores) *in Journ. Bot. v.* vi. *p.* 296.
Pereira. El. Mat. Med. ed. 3rd. vol. 2. *p.* 1139 (Species ex Gambia).

Scapis longiusculis, fructu oblongo altero latere subcompresso, foliis lato-lanceolatis. *Timmenensibus*, Masengbáni, *Bullomensibus* Cumbulu.

Floret a Januario usque ad Junium. *Crescit* in locis paludosis *Sierræ Leone*, litoris *Bullomensis* et in vicinitate urbis Susuensium *Tuki-Kerren* prope flumen Pongas dictum. *Stirps* quod ad omnes suas partes glabra. *Radix* ut in *Zingibere officinali*, crassa, radiculis filiformibus longissimis instructa et unicum plerumque ferens caulem, sub cujus basi provenientes Scapi surgunt vix nisi duo oppositi, et ex ætate inæquales. *Caulis* altitudine fere hominis, sed crassitudine solum digiti, sterilis, simplex, basi vix vel parum tumidus, strictus,

* *Bowdich's, Mission to Ashante*, p. 446.

teres, ex vaginis compositus arcte appressis, superioribus foliiferis. *Folia* longitudine dodrantalia, latitudine pollicaria superque, atque adeo lato lanceolata dicenda, disticho-alterna, distantia, brevissime petiolata, basi inæqualia, reclinata, longe acuminata, utrimque lineata, supra saturate viridia, subtus carinata, pallidissima. *Scapi* 3—4 pollicares, erecti vaginis magnis sursum increscentibus truncato-mucronatis fuscis imbricate et penitus vestiti apice 2—4 flori. *Flores* aggregati, spathis lanceolatis, communi bivalvi coriacea, propriis univalvibus membranaceis instructi. *Corolla* monopetala, tubo longo angusto intra vaginas Scapi superiores et spathas florum toto recondito, alba inodora quinquepartita: *laciniis* tribus exterioribus, quarum anterior major oblonga, sub emarginata, laterales minores lanceolata obtusiusculæ: duabus interioribus, quarum una maxima nitidissima, a basi supra medium per longitudinem cerea, ceterum nivea margine undulata, apice crenulata et altera parva loco Filimenti angusta, in sinu laciniæ exteriarum majoris prorsus occultata, ad basim apendicibus duabus erectis linearibus instructa, in medio lato-linearis compressa, ad apicem excurrens in duo cornua lineari introrsum versa rubicunda, et infra illa in duos dentes approximatos subulatos, apice conniventes et introrsum deorsumque flexos. *Filamentum* nullum nisi pro eo sumere velis, quam supra nominavimus, parvam illam ex interioribus Corollæ laciniam. *Anthera* unica in duos divisa lobos, quorum quisque affixus est margini interiori cujusque ex duobus dentibus infra apicem laciniæ corollinæ parvæ enatis. *Stylus* longus filiformis hyalinus, basin dentium antheriferorum attingens. *Stigma* magnum compresso-campanulatum, inter lobos antheræ et supra illos protensum in medio materia gossypina repletum, alias vacuum margine integro, album rubro colore aliquantulum tinctum. *Capsula* vaginis spathisque remanentibus magnis fuscis adeo tecta, ut nisi illis remotis videri nequeat, bipollicaris et supra, oblonga acuta: rostro longo materia spongiosa albissima repleto, trilocularis, roseo-coccinea. *Loculamenta* compressa separabilia, singula circumdata materiâ fere citrina elegantissime crystallina subpellucida, ope filorum in duas series dispositorum affixa columnæ centrali membranaceæ albissimæ tri-alatæ: alis loculamenta dividentibus et ad corum extremitatem extensis. *Semina* angulata acuminata rugosa aterrima nitida basi glauco-albida (*Afzelius ubi sup.*).

In consequence of this and another species growing blended together in the same locality, both were sent to Dr. Hooker under one name, and hence the flowers of this became united with the leaves and fruit of the succeeding *Amomum*. The native collectors aver that they belong to the same plant, but subsequent investigations have satisfied me that these fragments pertain to two distinct species. The *Amomum palustre* is usually limited to the swampy lowlands or margins of lagoons, and is therefore abundant on the banks of several streams that flow through the Foulah, Soosu, and Timneh countries. It is also to be found in the marshy grounds at Koto, near Cape St. Mary, in the Gambia, and is asserted to be indigenous to the rivers Casamanca, Pongas, Sherbro, and to many of the maritime regions so far south as Cape Palmas. In Sierra Leone this species is comparatively scarce, and with difficulty can be procured from the wooded ravines beyond Regent and the Sugar-loaf mountain. The vernacular title among the Mandingo's is *Parlancunpon*, the Timneh's, *Massa-egbané*, and the Soosu's, *Kumbulu*. In beauty and delicacy of florescence, it surpasses every African *Amomum* at present known. The plant is of moderate elevation, the stem seldom attaining six feet in height. The leaves briefly petiolate, are singularly unequal at their base, broad-lanceolate, and sharply acuminate. The flowers are inodorous, of a pure and waxy whiteness, with the lower portions of the corolla golden yellow, and the superior margin of the anther and filament of a rich pink. In some situations the flowers are pervaded by a faint pinkness. The bracts or scales are of a deep red color. The fruits, either single or conjugate, are surmounted on short scaly scapes. Their magnitude apparently depends on local influences. In length they average about 2—2½ inches, and 1½ in breadth at their base.

They are, however, sometimes met with, barely an inch long, and 4—5 lines broad. When mature the pericarp is thin, smooth, and of a fine reddish pink. In shape they somewhat resemble a carboy, broad decanter, or water cooler, being round and wide at their base, but suddenly contracting into a long narrow apex or neck (fig. 9). In the dry state the capsule is variable in form, becomes irregularly wrinkled by longitudinal striæ, is more or less coriaceous, and almost hidden by the surrounding bracteæ. Its proportions are also less rotund, being semicircular or obtusely triangular, while the apex, more attenuated and sharply beaked, is crowned by a small tubercular expansion (fig. 10). The pulp, like the preceding, is divided into three equal parts, and is not acid, at least in the Sierra Leone species that came under my notice. The seeds are grey or leaden-colored, angular, with a remarkably large and fleshy pale yellow tubercle at the base (hilum), which in a dried condition becomes either more or less concave or pointed, and of an orange or pale yellow hue. Both capsules and seeds are highly aromatic, the latter in particular being endowed with a rich spicy flavor analogous to that of coriander.

Fig. 9.

Amomum Palustre.
(Fruit of natural size).

Fig. 10.

A. Palustre.
(Dried capsule and seeds).

The *Amomum* belonging to the Gambia alluded to by Pereira* is either a variety of this species, or another very closely related to it, probably the former as the general outline differs but slightly. The numerous sheathing bracts, that closely envelope, and almost conceal the contracted capsule, are common to both. The peculiar leaden hue of the seeds, the form of the fruit, and other characteristics of the plant indicate a near approach to identity. The only deviations observable in the Gambia specimens are in the fruit, which is larger, more ovate or oblong in shape and less beaked, the seeds are likewise plumper, smoother, and feebly aromatic, and the hilum is also less in size. Moreover the flowers are of pinkish white, and the pulp agreeably and moderately acidulous. The native authorities observe that this is the only *Amomum* found growing in the midst of morasses or stagnant waters. The Mandingo's and Feloops delight in sucking the fresh pulp.

The portions of this plant held mostly in requisition by the negro communities are the seeds, which are employed more as an article of perfumery, than of medicine.

* *Ubi supr.*, *p.* 1139.

The Timneh women pulverise the fresh seeds between two stones, which after their reduction into a fine powder, they triturate with *Bamba-tulu* or *Donah* butter,* and anoint their bodies. Afzelius states that the powdered seeds are applied to the forehead, temples, and neck in pains of the head. It may, however, be considered doubtful whether this is their legitimate use, as the native doctors invariably prefer the pungent and peppery seeds of the *A. Granum Paradisi*, or *A. Excapum* for rubefaciant purposes, and they are in general tolerably plentiful in most of the localities previously mentioned.

Amomum *Pereirianum*.

(*The slender-scaped Amomum.*)

A. cereum, *Hook. fil.* (folia et fructus) *in Journ. Bot. v. vi. p.* 296.

Foliis lineari-lanceolatis (basi obliquis) apice longe acuminatis, ligula brevi truncata scapo gracili elongato sub-6-floro, bracteis appressis obtusis truncatisve cuspidatis, fructu lineari-lanceolato seminibus majusculis angulatis pulpa (sicco tenui) immersis, testa læte brunnea. An A. citratum, *Pereira, Mat. Med. v.* 2, *p.* 1137?

Hab. Regent, Sierra Leone. *Dr. Daniell.*

Folia 6—10 unc. longa, 1—1½ lata, basi superiore breviore in petiolum brevem decurrente. *Scapi* floriferi 4 unc., fructiferi 8 unc. longi, graciles. *Bracteæ* sensim majores, ½—2-unciales. *Fructus* gracilis, apice rostratus, 2—2½ unc. longus, siccus ⅓ unc. latus, parietibus ut videtur coriaceis. *Semina* magna, ⅛ unc. diametro, insapida (*Hook. fil. ubi sup.*).

Fig. 11.

Amomum Pereirianum.
(Dried fruits and seeds).

Owing to the fact of the flowers from which the name of *A. cereum* was derived belonging to the *A. Palustre* Afz., I have to suggest that this species should be designated in honor of the late Dr. Pereira, to whose indefatigable researches we stand so much indebted for our knowledge of those scitamineous products, usually understood as the *Grains of Paradise*.

This *Amomum* is very rare, and has hitherto been discovered only in the densely wooded and swampy ravines beyond the Sugar-loaf mountain in Sierra Leone. It has apparently not been noticed by the native populations, and therefore enjoys no vernacular appellation. The plant is of moderate growth, about 4—6 feet in height, bearing pale green, narrow lanceolate leaves, briefly petiolate, with an oblique base. The flowers are not known. The fruits are produced either singly, or conjunctively in two's or three's, supported by a long slender scape from 1½—2 feet high, and are furnished with short thin, papyraceous-like bracts, of a more delicate structure than others, and covered at intervals by minute dots. The pericarp in the ripe state is deep pink, thin, and compactly invests the mass of seeds. The pulp is slightly humid, sweetly or mildly acidulous, and divided

* The *Shea-toulon* of Park, obtained from the seeds of the *Bassia Parkii*, Don.

by septa into three equal parts, each part independently enclosing its own seeds, as in the preceding species. The capsule 2—3 inches long and 1¼ inches broad when dry, is oblong-ovate or cylindrical, of an orange or ruddy brown, smooth, barely striated, and dotted with reddish spots, especially near the apex, which is terminated by an infundibuliform remnant of the calyx (fig. 11). The seeds are large in proportion to the capsule, acutely and irregularly angular, of a yellowish or ruddy brown, with a glossy delicate striated testa, and small whitish circular concavity surrounded by a reddish areola, at the inferior extremity. They are destitute of any essential flavor, although the dried capsule when opened evolves an aromatic aroma.

In some respects the fruit and seeds appear to resemble the *A. citratum* of Pereira, which from their appellation of "*Grana Paradysi*" in the British Museum, doubtless came from some country in tropical Africa. The latter has, however, a larger and more tapering capsule, with the base contracted into an ovoid shape, and having that remarkable prolongation of apex, which permits of its artificial separation into two parts, thus serving to unite different fruits together in bunches. The seeds are larger, oblong, and of a paler hue, and possess that lemon-grass flavor by which they have been chiefly distinguished. It is not improbable that these two products may belong to mere varieties of the same plant, for the taste of the seeds, like their form and hue, we know is greatly modified by local agencies. It will however be necessary, from the want of this definite information, to consider them as distinct species. As a general rule, the seeds of the West African *Amoma*, when enveloped in an acid pulp, are more or less deficient in aromatic pungency and flavor, whereas (with the exception of the *A. longiscapum*) the contrary is the fact should the pulp be free from this peculiarity.

Although several other species of *Amoma* in leaf and flower only, have been brought from Sierra Leone, it would not be desirable, while the fruits remain unknown, to enter into any description of such fragmentary portions.

ON THE MANUFACTURE OF THE CHINESE GREEN DYE, CALLED 緑膠 *LO-KAO.*

BY THE REV. M. HÉLOT,*

Missionary of the Company of Jesus.

On the 6th of August, 1856, I received through the Rev. Father Borgniet, Apostolic Pro-vicar of the Mission in Kiang-nan (China) a note addressed by the President of the Central Council for the Propagation of the Faith, of Lyons, on the subject of a certain Green Dye said to be used by the Chinese. A request accompanied it, that I would omit no steps in order to obtain a prompt and exact reply to the inquiries it contained.

Setting aside, therefore, all other engagements, I commenced my investigation. At Shanghai I could obtain no positive information; not only is the dye in question not prepared there, but it is not even found there in commerce; when Europeans inquire for it through their *compradors*, the latter obtain it from Soo-chow, and sell it at an exorbitant price.

I was, however, fortunate in discovering that the Green Dye was prepared on a considerable scale at Azé, a town of from 6000 to 8000 souls, situated

* [In the *Pharmaceutical Journal* for October last, there appeared some account of the Chinese Green Dye, from the pen of Mr. Daniel Hanbury. For the following more copious details, obtained by the Rev. M. Hélot, we are indebted to a friend in China. As the Dye in question appears likely to attract some attention, we have thought the notice of M. Hélot, although somewhat lengthy, of sufficient interest to merit translation. We have, however, slightly condensed it in some parts.—Ed. *Ph. Journ.*]

eight leagues to the south of Kia-hin-fou, in the province of Tche-kiang. The Reverend Pro-vicar at once determined that I should proceed thither. A large Christian community of Tche-kiang located near Azé, facilitated my expedition, which would otherwise have been rather hazardous. M. Edan, French Consul at Shanghai, had the kindness to give me for a companion one of his most intelligent *employés*, one who had resided not far from Azé, and who had been formerly a pupil of the Reverend Fathers, the Lazarists of Tche-kiang. The worthy Christians received me with the utmost cordiality, and omitted nothing to put me in the way of obtaining the desired information. They would, in fact, at once have conducted me to the workshops where the manufacture was carried on, but at that season the process was not in operation. They therefore sent for the chief workmen engaged in the manufacture of the dye, and I interrogated them separately, and thus obtained an acquaintance, at least tolerably definite, as to the preparation of this valuable colour. This I hasten to lay before the President of the Central Council; if it considers it as still uncertain and insufficient, it will be desirable to pay another visit to Azé during the month of November;—or it would perhaps be still better to cause two or three workmen to come to Shanghai, and there and then to prepare the dye; some workmen of Azé, friends of the Christians there, have in fact offered to go.

The following is the note which was received from the Central Council of Lyons:—

Note to be transmitted to the missionaries in China.

"There occurs in trade at Shanghai, in China, a green substance resembling Javanese indigo, but not really indigo. This substance, which is called *Lo-kao*, is not prepared at Shanghai, but in some other part of China, which we know not. It is said that this green colouring matter is in China very scarce and dear. It is employed, nevertheless, in dyeing the coarsest cotton cloths, which appears a striking contradiction.

"It would be very important for the manufacturers of Lyons to obtain some precise information on the following questions:

"1. What is the price of the *Lo-kao* at Shanghai?

"2. What is the plant, and what is the part of the plant that yields this green dye?

"3. What are the processes employed by the Chinese for extracting the colour from the plant, and for employing it in dyeing?

"4. Could one obtain with certainty the seeds of the plant whence the *Lo-kao* is extracted, as well as information regarding its culture and the situation most favourable for it?

"We are aware that the points upon which we request information are numerous, and that they may be obtained with difficulty; but it being a question of obtaining a substance which would be of great service to our manufacturers, a small amount of information even would be useful.

"The seed of a shrub, said to be that which furnishes the *Lo-kao*, has been received, and the shrub itself is cultivated; but as there is still some uncertainty as to its origin, it is very important to obtain it afresh, so that we may more confidently persevere in those labours which will lead to the desired result."

To commence my history:—About the years 1848 to 1850, specimens of some Chinese productions were sent to the Minister of Commerce; among them some cloth of a sea-green colour attracted attention. It was placed in the hands of some skilful chemists, who were astonished to find that they could not detect in it by reagents, either a blue or a yellow colour. Hence they inferred that its colour was due to some green colouring principle unknown in Europe. Traces of alumina and of iron were all that could be detected. As at this period we had no consul in China, the American Consul at Canton was addressed for more ample information. He could procure only about fifteen grains of the desired material, but the experiments made upon this small

quantity gave the most satisfactory results. Recourse was again had to the American Consul, who succeeded this time in sending a pound of the dye at a price of 35 dollars, promising also to write to Shanghai for information about it, since it appeared not to be prepared in the south of China. M. de Montigny, who had just been appointed French Consul at Shanghai, now received from the Minister instructions to pay attention to the matter. Assisted by the Missionaries both of Kiang-nan and Tche-kiang, he succeeded in procuring some ounces of the Green Dye; but as it was necessary, in default of other information, to obtain it from Soo-chow-foo, its rarity and dearness were exaggerated by the dealers, and it had to be paid for at the rate of 10 dollars per oz.

About the year 1854, M. de Montigny sent seeds of the trees which furnish the *Lo-kao*, and two glass cases containing from two to three hundred plants, the whole obtained from authentic localities, through the intervention of the Lazarists of Tche-kiang.

Such was the position of the question, when the Reverend Apostolic Provicar commissioned me to investigate the subject, and the following is the information I have obtained:—

1. The trees which yield the *Lo-kao* belong to two species. At the period of the fall of the leaf, it is collected by the peasants in the districts where the dye is manufactured, and consists of fagots of small wood, known by the name of *Lo-za* (green-branch). The *Lo-za* is of two species, or it may be but two varieties of the same species: the one, which comes from the sterile mountains in the S.W. of Tche-kiang and Shantung, is called *Pa-bi Lo-za;* the other, which forms a bush, also uncultivated, occurs in the fertile plains in the neighbourhood of Azé in Tche-kiang, and is named *Hom-bi Lo-za*. At Azé, the fagot of 100 pounds of *Hom-bi Lo-za* costs 1000 *sapecs*, that is about 5 francs; while a similar fagot of *Pa-bi Lo-za* costs about three times that sum. I may remark that the name *Lo-za*, which is given to the shrub in Tche-kiang, is not its correct appellation, but only that of the branches made into fagots, and found as an article of trade for preparing the dye; for the word *za*, which signifies *fagot* or *small wood*, is employed to express any wood used for fuel. The people of Shantung, who also have this shrub on their mountains, say that it is called *Lieu-lo-chou* (*Lieu-green-tree*), and that at the commencement of winter it is carried about for sale in small fagots under the name *Lieu-lo-tche*.

I have had made by a Chinese artist a drawing from nature of a branch of the *Hom-bi Lo-za* loaded with seeds, still green, but which towards winter become black. The mail of December will, I hope, bring you about 50 lbs. of these seeds:—at least, I have taken measures that it shall do so. If you desire plants, a case of them can be sent, but I am assured that the seeds will answer quite as well. If I can do so, I shall send you seeds of the *Pa-bi Lo-za* also.

The seeds and shrubs which M. de Montigny sent are certainly authentic. Both the *Hom-bi* and the *Pa-bi Lo-za* ought to be found among them; they may be distinguished, if by no other method, at least by the colour and preparation, which is still to be described.

2. The preparation of the green dye with the bark of the *Hom-bi Lo-za*, as carried on at Azé, is as follows:—

The Lo-za is taken, as before mentioned, in the form of fagots of small wood, which are brought in by the peasants. Its bark is then roughly removed with a knife; it should not be quite dry, as the dry bark is no longer rich in colouring matter; this is why the branches are not stripped until the time for using the bark. The smaller branches are crushed with a hammer; in fact, in removing the bark, a good deal of the wood adheres to it, so that a fagot of 100 lbs. is reckoned to give half its weight of bark. Of this bark, 12 lbs. are taken to 150 lbs. of water, and a decoction is made: a froth appears on the surface, which froth is at first white, and then passes to rose colour. It is this peculiarity which has occasioned the name *Hom-bi* (red-bark) to be applied to

this sort of *Lo-za*. When the froth or scum has assumed a rose colour, the fire is removed, and the contents of the boiler are poured into a large vessel and suffered to macerate for at least two days and two nights, after which it is ready for use. In very cold weather this maceration may be carried on for twenty days; if left longer the materials would spoil.

The preparation of the dye of the *Pa-bi Lo-za* is precisely the same, only that continued ebullition has not the effect of causing the froth to assume a rose colour, whence the name *Pa-bi* (white bark). Moreover, the maceration must be continued for at least ten days, whilst two days are sufficient in the case of the *Hom-bi*.

To insure success in the process of dyeing, clear, settled weather must be chosen, for the sun's action is absolutely necessary.

Placed ready for use, it is customary to have a vessel of lime water, which the Chinese prepare by putting the lime into a little bag and agitating it in a large quantity of water.

Dyeing Cotton Cloth green.—The dyeing-liquors both of the *Hom-bi* or *Pa-bi Lo-za*, being ready as well as the lime water, the colouring is communicated to the cloth by dipping it from seven to ten times in the decoction of *Hom-bi*, concluding by three dippings in that of the *Pa-bi*, care being taken to allow the cloth to dry between each immersion. The details of the operation are as follow:

We have already mentioned that the bark of the Lo-za is allowed to macerate two days in the case of the *Hom-bi Lo-za*, and ten in that of the *Pa-bi Lo-za*. The maceration being then complete, and the weather fine enough to admit of the dyeing process being commenced, the bark is removed from the liquor, and a small quantity of lime water added; the cloth is then plunged into the cold solution, wrung out so as to avoid any waste, and then, without rinsing, spread upon the ground to dry. It is important that the drying be not too rapid. For this reason, the dipping is not commenced till the latter part of the day, so that the cloth may be exposed all night and receive the benefit of the following day's sunshine. But even sunshine may be in excess. This operation having been repeated from seven to ten times with the liquor of the *Hom-bi Lo-za*, and afterwards with that of the *Pa-bi Lo-za* (lime water being added as in the former case), the cloth is dyed, but on one side only, viz., that which has been exposed to the sun. Such cloth is called here in commerce *Se-lo-pou* (coloured-green-cloth).

If after the dyeing operation is over, there still remains some of the solution unused, it may be employed the following day, a little more of lime water being added to it. If there is still some over for a third operation (which ought to be avoided), it may be used, provided a still larger quantity of the alkaline solution be added to it, and so on for any further residue.

I have asked many questions as to the use and properties of the two dyes *Hom-bi* and *Pa-bi*, and, so far as I can find, it seems clear that the solution of *Hom-bi Lo-za* gives a deeper, stronger shade, but without lustre or reflection; while the solution of *Pa-bi Lo-za*, though affording a feebler hue, imparts a magnificent lustre [*reflet magnifique*]. The ground of the colour is therefore produced with the *Hom-bi*, and it is completed with the *Pa-bi;* and thus is obtained the green colour that is most esteemed by the Chinese. I send you a small sample of cloth purchased at Shanghai for a sum equivalent to 25 French *centimes*. A similar quantity of uncoloured cloth is worth two-thirds the price. From data like these I estimate that the dyeing of a square *mètre* of cotton cloth costs from 8 to 9 *sous*.

I have put many questions, in order to discover if any of the mordants used by the Chinese for other dyes—such, for instance, as alum, green vitriol, potash, &c.—is ever employed with this green; but the constant reply has been, that no other than lime water is used. I have a suspicion, however, that in the north, the peasants do make use of a solution of alum.

(*To be continued.*)

CHEMICAL REPORT ON THE MODE OF DETECTING VEGETABLE SUBSTANCES MIXED WITH COFFEE FOR THE PURPOSE OF ADULTERATION.

BY PROFESSOR GRAHAM, DR. STENHOUSE, AND MR. DUGALD CAMPBELL.

Addressed to the Chairman of the Board of Inland Revenue.

(*Continued from page* 233.)

6. Coffee, and the various vegetable substances used in its adulteration, may be incinerated on a platinum or porcelain capsule, and leave an earthy ash, of which the composition is often characteristic of the plant. Valuable information may be obtained, without making a formal analysis of the ash, by simply digesting it in strong hydrochloric acid. The earth which remains undissolved after this treatment is silica. Now coffee, we find, is remarkably distinguished from the roots and cereals, by the small quantity of silica it affords. The quantity of that earth found in coffee is so small, that it may be doubted whether coffee contains any silica except what may accidentally adhere to the coffee-beans, when collected, in the form of sand. The proportion of silica found in the twelve samples of coffee of Table IV. was as follows:—

TABLE VII.

Silica in roasted coffee.

	Per cent. in ash.		Per cent. in ash.
Sample 1	0.	Sample 7	0.
" 2	0.	" 8	0.45
" 3	0.26	" 9	0.
" 4	0.02	" 10	0.
" 5	0.17	" 11	0.
" 6	0.28	" 12	0.09

The only case in which the silica approaches to half a per cent. of the ash is sample 8; and in another sample of the same coffee, which was properly screened before roasting, the silica of the ash fell to 0.

On the other hand, the silica and sand, insoluble in acids, of four samples of roasted chicory, amounted to so much as 10.69, 13.13, 30.71, and 35.85 per cent. of the ash. It may be added that the portion of this silica soluble in alkali, was, in the same samples, 2.61, 3.81, 10.52, and 12.75 parts; the portion of silica insoluble in alkali, 8.08, 9.32, 20.19, and 23.10 parts.

The whole silica in roasted dandelion root amounted to 11.26 per cent. of the ash.

In other cultivated roots the proportion of silica does not appear to be so large as in chicory. The silica is always expressed with reference to 100 parts of the ash. Messrs. Way and Ogston find in the root of the carrot from 0.76 to 1.92 silica; in beet, from 1.4 to 4.11 silica; and in turnip, from 0.96 to 2.75 silica.

The proportion of silica appears to be low in certain grains and seeds, although rarely descending to the insignificant proportion of the coffee-bean,—and to be very high in other grains. We find in the ashes of acorns 1.01 per cent. of silica; in maize, 1.78 per cent. of silica; in the white lupin of the Levant, 0.87 per cent. of silica. Messrs. Ogston and Way report from 2.05 to 5.46 silica for wheat; from 23.6 to 70.77 silica for barley; from 38.48 to 50.03 for oats; and 9.22 for rye.

It appears, therefore, that the presence of one per cent. or upwards of silica in the ashes of coffee is a proof of adulteration; that the adulterating substances, which increase the proportion of silica most considerably are oats and barley, then chicory and dandelion, which are followed by rye; wheat, beet, turnip, and carrots would produce a small and less decisive effect.

There will now be presented complete analyses, made for this inquiry, of the ashes of seven varieties of coffee, and four different samples of chicory.

TABLE VIII.

Analyses of the Ashes of Coffee and Chicory.

COFFEE.

	Plantation Ceylon.	Native Ceylon.	Java.	Costa Rica.	Jamaica.	Mocha.	Neilgherry.
Potash	55.10	52.72	54.00	53.20	53.72	51.52	55.80
Soda	—	—	—	—	—	—	—
Lime	4.10	4.58	4.11	4.61	6.16	5.87	5.68
Magnesia	8.42	8.46	8.20	8.66	8.37	8.87	8.49
Sesquioxide of iron	0.45	0.98	0.73	0.63	0.44	0.44	0.61
Sulphuric acid	3.62	4.48	3.49	3.82	3.10	5.26	3.09
Chlorine	1.11	0.45	0.26	1.00	0.72	0.59	0.60
Carbonic acid	17.47	16.93	18.13	16.34	16.54	16.98	14.92
Phosphoric acid	10.36	11.60	11.05	10.80	11.13	10.15	10.85
Silica	—	—	—	—	—	—	—
Sand	—	—	—	—	—	—	—
Total amount	100.63	100.20	99.77	99.06	100.18	99.68	100.04

CHICORY.

(Deducting sand and silica.)

	Darkest English (Yorkshire).	English.	Foreign.	Guernsey.
Potash	38.53	27.85	46.07	46.27
Soda	9.34	16.90	3.17	5.49
Lime	10.79	10.81	7.78	7.65
Magnesia	6.06	8.08	5.33	5.55
Sesquioxide of iron	4.38	3.50	8.29	5.08
Sulphuric acid	11.38	11.78	8.38	8.67
Chlorine	5.67	5.23	5.03	6.58
Carbonic acid	2.04	3.22	4.36	4.60
Phosphoric acid	12.27	12.61	11.00	9.59
Silica	—	—	—	—
Sand	—	—	—	—
Total amount	100.46	99.98	99.41	99.48

(Deducting sand and not silica.)

	Darkest English (Yorkshire).	English.	Foreign.	Guernsey.
Potash	37.07	27.13	40.20	41.41
Soda	8.99	16.46	2.77	4.92
Lime	10.38	10.53	6.79	7.85
Magnesia	5.83	7.87	4.66	4.97
Sesquioxide of iron	4.22	3.41	7.24	4.55
Sulphuric acid	10.95	11.48	7.32	7.76
Chlorine	5.46	5.10	4.39	5.89
Carbonic acid	1.97	3.14	3.81	4.12
Phosphoric acid	11.81	12.29	9.60	8.59
Silica	3.81	2.61	12.75	10.52
Sand	—	—	—	—
Total amount	100.49	100.02	99.53	99.58

(Not deducting sand and silica.)

	Darkest English (Yorkshire).	English.	Foreign.	Guernsey.
Potash	33.48	24.88	29.56	32.07
Soda	8.12	15.10	2.04	3.81
Lime	9.38	9.60	5.00	5.31
Magnesia	5.27	7.22	3.42	3.85
Sesquioxide of iron	3.81	3.13	5.32	3.52
Sulphuric acid	10.29	10.53	5.38	6.01
Chlorine	4.93	4.68	3.23	4.56
Carbonic acid	1.78	2.88	2.80	3.19
Phosphoric acid	10.66	11.27	7.06	6.65
Silica	3.81	2.61	12.75	10.52
Sand	9.32	8.08	23.10	20.19
Total amount	100.85	99.98	100.66	99.68

The first difference which appears upon comparing the two sets of analyses, is the absence of soda in coffee, and its presence in chicory to the extent of from 2.04 to 15.1 per cent. of the ash. The united amount of potash and soda does not differ much in the two substances. In chicory, the lime is greater and the magnesia less than in coffee. The sesquioxide of iron is strikingly different, being always under one per cent. in coffee, by our experiments, and ranging from 3.13 to 5.32 per cent. in chicory. The ash of chicory is, on this account, red to the eye when compared with that of coffee. The difference in chlorine is also important, the highest proportion observed in coffee-ash being 1.11 per cent., and the lowest proportion in chicory-ash 3.28 per cent. Coffee gives an ash which is highly carbonated, the cabronic acid varying from 14.92 to 18.13 per cent.; while the ash of chicory is only slightly carbonated, containing from 1.78 to 3.19 per cent. of carbonic acid. The proportion of phosphoric acid is pretty similar in the two kinds of ash. The disparity in the silica has been already referred to.

The differences most available in the two kinds of ash, as distinctive tests for coffee and chicory, appear to be the following:—

	In Coffee-ash.	In Chicory-ash.
Silica and sand	—	10.69 to 35.85
Carbonic acid	14.92 to 18.13	1.78 to 3.19
Sesquioxide of iron	0.44 to 0.98	3.13 to 5.32
Chlorine	0.26 to 1.11	3.28 to 4.93

Another series of ash analyses was executed, comprising the ash of the white lupin of the Levant—a seed which, from its chemical properties and low price, is not unlikely to be substituted for coffee—the ash of acorns, of maize, and of parsnip and dandelion roots.

TABLE IX.

Analysis of ashes of certain seeds and roots.

(Not deducting silica, &c.)

	Lupins.	Acorns.	Maize.	Parsnips.	Dandelion root.
Potash	33.83	55.49	31.28	56.86	20.22
Soda	17.90	0.63	—	—	34.87
Lime	7.81	6.98	3.11	6.88	12.87
Magnesia	6.23	4.36	14.98	6.52	1.47
Sesquioxide of iron	—	0.54	0.85	0.53	1.42
Chlorine	2.12	2.53	0.50	2.10	4.32
Sulphuric acid	6.85	4.83	4.20	4.09	2.66
Carbonic acid	0.56	13.82	—	11.50	6.99
Phosphoric acid	25.74	11.26	45.29	13.91	12.63
Silica, &c.	—	—	—	—	—
Total amount	101.04	100.44	100.21	102.39	97.45

Analyses of Ashes of certain Seeds and Roots.

(Not deducting silica, &c.)

	Lupins.	Acorns.	Maize.	Parsnips.	Dandelion Root.
Potash	33.54	54.93	30.74	56.54	17.95
Soda	17.75	0.63	—	—	30.95
Lime	7.75	6.01	3.06	6.85	11.43
Magnesia	6.18	4.32	14.72	6.49	1.31
Sesquioxide of iron	—	0.54	0.84	0.53	1.27
Chlorine	2.11	2.51	0.50	2.09	3.84
Sulphuric acid	6.80	4.79	4.13	4.07	2.37
Carbonic acid	0.56	13.69	—	11.44	6.21
Phosphoric acid	25.53	11.15	44.50	13.84	11.21
Silica, &c.	0.87	1.01	1.78	0.57	11.26
Total amount	101.09	99.58	100.27	102.42	97.80

In the ash only of the dandelion root is the silica sufficiently large in quantity to make a good distinction from coffee. Lupins and maize are distinguished from coffee by their low proportion of carbonic acid. The white lupin, both of the Levant and England, we find to contain a notable quantity of manganese. The oxide of iron is everywhere too low to be serviceable. Chlorine appears as low in maize as in coffee, but the proportion of that element is doubled in lupins, acorns, parsnips, and nearly quadrupled in dandelion: a high proportion of phosphoric acid distinguishes maize, and we may add all the other cereals, from coffee.

The ash of the turnip root contains, according to Way and Ogston, from 9.54 to to 14.82 per cent. of carbonic acid, which is very different from chicory, and nearly as high as in coffee. The sesquioxide of iron of turnip is also given even lower than in coffee—from 0.14 to 0.66 per cent. Chlorine appears to be as abundant in the turnip, in the form of chloride of sodium, as in the chicory root.

According to the same excellent authorities, in beetroot-ash the carbonic acid varies from 15.23 to 21.61 per cent., and is therefore quite as high as in coffee-ash;

the sesquioxide of iron, from 0.52 to 3.74 per cent., small as in coffee; the chlorine very large and distinctive, being represented by from 14.18 to 49.51 per cent. of chloride of sodium.

In the ash of the carrot, the carbonic acid is from 15.15 to 19.11 per cent.; the sesquioxide of iron, from 0.59 to 1.66 per cent.; chlorine nearly as in chicory, being represented by from 4.91 to 7.65 per cent. of chloride of sodium (Way and Ogston).

7. The action of the more ordinary chemical reagents upon infusions of coffee and chicory may now be noted. The indications thus obtained with coffee are unfortunately rendered much less characteristic by the torrefaction of the seed.

TABLE X.

Action of certain Chemical Reagents upon Infusions of Coffee and Chicory.

	Raw Coffee.	Roasted Coffee.	Raw Chicory.	Roasted Chicory.
Potassa	A bright reddish-yellow liquid, and no precipitate.	Brownish-yellow liquid, and no precipitate.	Not altered.	Not altered.
Lime-water	Pale-yellow liquid; on standing, becoming green at the surface; no precipitate	Reddish-brown, with shade of purple, and no precipitate.	Not altered.	Not altered.
Acetate of copper ...	Dirty-green precipitate.	Brownish-green precipitate.	Pale-green precipitate.	Gelatinous precipitate of a reddish-brown colour.
Perchloride of iron...	Deep-greenish-black precipitate.	Very dark greenish-black precipitate.	Blackish-brown coloured liquid.	No effect.
Nitric acid.....	Bright red-coloured liquid.	Clear port-wine-coloured liquid.	No effect.	No effect at first; on standing, port-wine colour.
Sulphuric acid	Dirty blackish-brown-coloured liquid	Dark blackish-brown-coloured liquid.	Deep blackish-brown-coloured liquid.	Brownish-black liquid.
Hydrochloric acid ...	Pale brownish-yellow liquid.	Port-wine-coloured liquid.	No effect.	Slightly darkens the liquid.

In allowing a solution of unroasted coffee to stand, its green colour becomes gradually deeper. This change is due to oxidation and the formation of the viridic acid of Rochleder. It is greatly promoted by the presence of an alkali: an excess of lime brings out this colour very strongly in a day or two,—giving at first, however, a bright yellow colour. Subacetate of lead gives, in unroasted coffee, a yellow precipitate, which does not become green. An excess of acetate of copper gives a green precipitate in abundance, which is brightened by the addition of an alkali. This copper precipitate has been used as a green pigment. The reactions above described are, however, much altered and obscured by the roasting of the coffee, and are therefore of little service for our present purpose.

It has already been stated that iodine produces no blue colouration in the infusion of either coffee or chicory. If the reagents named act clearly in a different manner upon any infusion from what they do upon pure coffee, a presumption of adulteration is obtained, but the indications must be of a positive and specific nature fully to establish adulteration.

8. Coffee was submitted to the usual process of distillation with soda-lime for the determination of its nitrogen. The proportion of nitrogen per cent. was, in coffee, sample 1 (Table VII.), roasted, 2.93; in sample 2, roasted, 2.62; in sample 3, raw,

2.53, roasted, 2.70; in sample 4, raw, 2.71; in sample 5, raw, 2.50, roasted, 2.49. The proportion of nitrogen in roasted coffee appears therefore to lie between two-and-a-half and three per cent.

The nitrogen in a specimen of foreign chicory amounted, in the raw chicory, to 1.51 per cent.; in the same roasted, 1.42 per cent. The same of English growth gave, in the raw state, 1.86 per cent. of nitrogen; and in the roasted state, 1.74 per cent.

The proportion of nitrogen in coffee is therefore greater than in chicory; but the difference is not sufficiently marked to distinguish the two substances easily from each other. The conclusion may, however, be drawn, that less than two per cent. of nitrogen in coffee is a strong presumption of adulteration.

We may now advert to the peculiar and characteristic substances found in coffee, and the aid to be derived from them in the discovery of adulteration.

9. Professor Rochleder, who has devoted great attention to the analysis of coffee, gives the following enumeration of the substances found in the raw coffee-bean, with the formulæ of their elementary composition:—

		C.	H.	O.	N.
Woody fibre		12	10	10	
Cane-sugar		12	11	11	
Fat	Palmitic acid	32	32	4	
	Oleic acid	36	34	4	
	Glycerine	6	8	6	
Legumin		48	36	14	6
Caffeic acid		16	7	6	
Caffeine		16	10	4	4

To these Rochleder had lately added citric acid ($C_{12}H_5O_{11}+3HO$), in the small proportion of two grains in a pound of coffee; also a trace, too small to be estimated by weight, of viridic acid ($C_{14}H_6O_7$). This last substance is the acid obtained by exposing solutions of the neutral and basic caffeates to the influence of the air. The green colour of raw coffee is believed by Rochleder to be owing to a small quantity of viridate of lime.

The evidence upon which Rochleder rests the existence of palmitic and citric acids in coffee does not appear to us quite decisive. The formulæ given by that chemist for both caffeic and viridic acids are doubtful.

It is also stated by Rochleder, that when dried caffeic acid is submitted to destructive distillation, a small quantity of crystals were obtained, which he considered to be pyrocatechine. The experiment repeated by us on a considerable scale gave a negative result.

Rochleder finds caffeic acid in Paraguay tea (*Ilex Paraguayensis*), as well as in coffee. This statement we must also doubt. The acid of the Paraguay tea has been examined by us, and found to have a certain resemblance to caffeic acid, but not to be identical with it. Free caffeic acid, when strongly heated in an open vessel, emits the peculiar odour of roasted coffee; but the acid from Paraguay tea emits a perfectly different odour when similarly treated.

The sugar of coffee may be inferred to exist in a peculiar condition, as was before hinted, from the fact that when the coffee is roasted, none of its sugar appears to be converted into grape-sugar, as it does not affect Trommer's test; while, when seven grains of cane-sugar were added to 100 grains of coffee, and the whole roasted in the usual way, abundant indications of grape-sugar were obtained by the same test.

M. Payen gives the proportional quantities of the different substances which he finds in raw coffee as follows:—

Cellular tissue	34.000	Nitrogenous portion	3.000
Hygroscopic water	12.000	Free caffeine	0.800
Fats	10. to 13.000	Thick insoluble ethereal oil	0.001
Starch, sugar, dextrin, and vegetable acids	15.500	Aromatic oil	0.002
Legumin	1.000	Mineral constituents: potash, lime, magnesia, phosphorus, sulphur, silica, and traces of chlorine	6.697
Chlorogenate of potash and caffeine	3.500		

Payen's chlorogenic acid is the same as the caffeic acid of Rochleder and Pfaff.

Payen believed that he had obtained from coffee a crystalline double salt of this acid, containing potash and caffeine ; but this observation has not been confirmed.

The proportion of fat in the coffee-bean is remarkably high, being generally stated at ten or above ten per cent. We found at least 8.9 per cent. of fat readily extracted by ether. In chicory the proportion of natural fat is scarcely appreciable; but it is brought up by the fat added in the process of roasting the chicory.

10. Some uncertainty existing respecting the proportion of the active principle, caffeine, in coffee, the point was particularly inquired into. The following process was adopted :—The raw coffee was ground fine, having been previously well dried at 212° to facilitate that operation. A decoction was then made of 1000 grains, by the repeated application of boiling water, so as to exhaust the coffee of all soluble matter. The solution was concentrated a little by evaporation. The acid of the coffee, and certain other substances, were now entirely precipitated by the addition, first, of the neutral acetate of lead, and then of the subacetate of lead. These insoluble matters were removed from the liquid by filtration. The excess of lead in solution was then thrown down by means of hydrosulphuric acid.

The liquid, after this preparation, was evaporated to dryness, and the dry matter left was exhausted by means of strong spirit of wine (sp. gr. 0.840). The alcoholic solution was concentrated by evaporation, and allowed to stand in a nearly syrupy state for about ten days, in order to crystallize. The crystals, which are caffeine, were collected upon a small filter, and compressed powerfully to remove the mother-liquor. These crystals were re-dissolved in a small quantity of water, the solution evaporated, and crystallized anew. It gave almost nothing but caffeine, in long silky white needles, with little or no colour. The proportion of caffeine obtained in five experiments, made upon different samples of coffee, was as follows :—

Caffeine in raw coffee.

In Native Ceylon	0.80 per cent.
" " "	0.80 " "
" " "	1.01 " "
" Plantation Ceylon.....	0.54 " "
" " "	0.83 " "

The caffeine of the wild coffee appears to exceed that of the cultivated plant; the mean proportion of caffeine in Native Ceylon being 0.87 per cent., and in Plantation Ceylon 0.69 per cent.

The mean average of the whole five samples is 0.80 per cent. of caffeine. Probably the actual quantity of caffeine in the coffee-bean is from 0.75 to one per cent., allowance being made for losses in the separation.

The proportion of theine (or caffeine) in tea is considerably greater, and more easily extracted. Two pounds of fine strong Congou yielded 2.93 grains of theine, or 2.09 per cent.

When it is merely desired to extract caffeine from raw or roasted coffee, without reference to quantity, the general process for the extraction of organic bases by means of ether suffices. Lime is added to the infusion of coffee, which is then evaporated to dryness upon a water-bath. The extract may be divided by means of clean sand, and then agitated with ether. The caffeine crystallizes as the ether evaporates, or it may be re-dissolved in water, and crystallized again. We believe that the caffeine from ten per cent. of coffee in a mixture might be extracted in sufficient quantity for its identification by the preceding simple process. Caffeine, when once obtained, is fully recognized by its easy sublimation, and also by its action with nitric acid, in which it resembles uric acid. When the solution of caffeine in nitric acid is evaporated to dryness, and exposed to ammoniacal gas, it is covered by a pink blush, like murexide.

The only other substances besides coffee in which caffeine is known to exist, are tea, Paraguay tea, and a species of chocolate made from the *Gaurana officinalis* or *Paullinia sorbilis*.

11. Chemists generally are disposed to refer the flavour and peculiar properties of coffee, as a beverage, more to its acid—the *caffeic acid* (particularly after that substance is modified in its properties by roasting), than to any other constituent of the seed. Rochleder considers this acid as belonging to the tannin class of substances,

and calls it tanno-caffeic acid. But as caffeic acid does not precipitate gelatine, it is deficient in the most characteristic quality of the tannic acids. Caffeic acid, in the present state of our knowledge, appears to be confined to the coffee-plant.

We have observed a property of caffeic acid which facilitates the detection of that substance, and consequently of coffee, in a mixture. Caffeic acid appears to be analogous to kinic acid, the acid of cinchona barks, for it yields kinone when oxidated by means of sulphuric acid and binoxide of manganese. To observe this property, the coffee is boiled with water and a little slaked lime, the infusion filtered, and evaporated down to the consistence of a syrup. The syrupy liquid is then mixed in a retort with four times its weight of binoxide of manganese, and one part of oil of vitriol diluted with an equal bulk of water. Sufficient heat is produced by the action of sulphuric acid upon the other materials, to bring over the greater portion of the kinone, and the lamp need not be applied till towards the close of the operation. The distillate consists of yellow crystals of kinone, which usually coat the neck and sides of the retort, and a bright yellow liquid, which is a saturated aqueous solution of kinone, with a considerable quantity of formic acid. Kinone is easily discernible by its volatility and peculiarly acrid odour, which greatly resembles that of chlorine. The solution of kinone gives with ammonia a sepia-black colour, and becomes reddish-brown with hydrosulphuric acid. It is decolourized by sulphurous acid. The beautiful green hydrokinone is obtained by exactly neutralizing the solution of the yellow kinone with sulphurous acid, great care being taken not to introduce the latter in excess.

The peculiar acid of Paraguay tea agrees with caffeic acid (to which it is no doubt related) in yielding kinone to similar oxidizing agencies: so does the acid of the leaves of common holly (*Ilex aquifolium*) tea, and the whole of the *cinchona* tribe.

The *prune* tribe of plants, including the sloe, cherry, laurel, &c., the seeds of which yield prussic acid, all contain amygdalin, or some similar principle. Now all of these, when oxidized in the same manner as the former class, yield oil of bitter almonds, and so can be recognized.

The *willow* and *poplar* tribe, on the other hand, yield oil of *Spirea ulmaria* (salicylous acid), a very characteristic substance.

The tests for kinone can be applied in a few minutes, and they are sufficient to indicate the presence of ten or twelve per cent. of coffee in a mixture.

12. The root of *chicory* presents no feature of a marked nature, beyond its large proportion of sugar and the composition of its ash, which have both been sufficiently adverted to. The proportion of fat naturally in the root is quite insignificant. In an infusion of the fresh undried root, neutral acetate of lead appears to throw down the whole acids of chicory, and the subacetate of lead produces no further precipitate in the liquid. But the root appears to undergo a considerable modification by being dried at a temperature not exceeding 212°. Its infusion now gives a second precipitate with subacetate of lead following the neutral acetate. Both of these precipitates can be well enough washed; but when the attempt was made to decompose either of them by means of hydrosulphuric acid, a mucilaginous liquid was obtained, from which the sulphide of lead does not fall, unless with a considerable addition of alcohol. The acid precipitates appear most indeterminate, and afford nothing crystalline. A great deal of pectin-looking substance is present. Chicory also appears to possess about one-fourth of the quantity of inulin that is contained in the dried root, and starch in no other form, the infusion of chicory giving only a brown with iodine, and no blue. Chicory appears to contain no oxalic, malic, citric, or any other crystallizable organic acid. The other sweet roots, beet, turnip, &c., also, like chicory, present little that is tangible in their chemical properties. But the dark colour of the infusions of all these roots when roasted, the great density of their solutions, and their fermentability, afford sufficient means for distinguishing them from coffee, and for discovering their admixture with that substance.

The properties of a great variety of other vegetable substances, which might possibly be employed in the adulteration of coffee, are exhibited in the early tables of this Report.

PRE-EXISTENCE OF COLCHICINE IN THE SEEDS OF COLCHICUM.

BY L. OBERLIN.

As this substance might be the result of the action of reagents upon the normal materials of the seeds of the *colchicum*, I endeavoured to ascertain its pre-existence, and I believe I have succeeded by proceeding in the following manner :—

I dissolved the alcoholic extract of the seeds of *colchicum*, previously freed from oil and starchy matter, in alcohol, and decolourized it by well-washed charcoal; after filtration, the charcoal was treated repeatedly with boiling alcohol, which was added to the first liquid. The syrup extract which remained after distillation, when dissolved in water and slightly acidulated with very dilute sulphuric acid, gives rise to a flocculent precipitate; the liquid, when filtered and left for some weeks, produces warty crystals. These crystallize in alcohol, and are identical with colchicine.

The action of acids upon analogous bodies having given rise to decompositions producing peculiar principles and glycose, I endeavoured to ascertain the presence of the latter in the mother-liquors from which the crystals of colchicine were deposited, but I only succeeded in isolating a resinous matter, insoluble in water, combined with some colouring matter, and very soluble in alkalies, a product consequently of an acid nature. The characters of this resinous matter are, that it is soluble in alcohol and ether, acquires a blood-red colour with nitric acid, and dissolves in ammonia, to which it also gives an intense red colour.

Physiological Experiments.—According to experiments made by Prof. Schroff* of Vienna, the colchicine obtained according to the process of Hess and Geiger, has a poisonous action upon rabbits even in doses of 0.01 grm.; the animal dies in from twelve to eighteen hours. Given in large doses, even of 1 grm., it does not produce death in less than seven or eight hours. When colchicine is injected into the stomach in a dose of 0.01 grm., the animal does not die for ten or twelve hours, but in a dose of five centigrms. it causes a complete paralysis of the members, and death in a few minutes.—*Comptes Rendus.*

ON THE DECOMPOSITION OF NITRATE OF POTASH BY CHARCOAL.

BY A. VOGEL, JUN.

The author has studied the behaviour of charcoal to nitrate of potash at various high temperatures. He obtained the following results:—

1. The oxidation of carbon by means of nitrate of potash takes place completely, and without incandescence, at a temperature which scarcely exceeds the melting point of nitrate of potash.

2. The carbon is oxidized in this process to carbonic acid, and never to carbonic oxide gas.

3. The nitric acid is decomposed into nitrogen, nitric oxide, and nitrous acid, according to circumstances.

4. According to the temperature and the relative quantities of carbon and nitrate of potash, the potash in the residue left after the process of decomposition exists as nitrite and carbonate of potash, accompanied by undecomposed nitrate of potash.

5. These processes are represented by the following equations:—

a. Residue, nitrite of potash.

1 equiv. KO, NO_5 + 1 equiv. C.

$$\left.\begin{matrix} KO, NO_5 \\ C \end{matrix}\right\} = KO, NO_3 + CO_2$$

b. a. Residue, carbonate of potash; gas consisting of carbonic acid and nitrogen.

2 equivs. KO, NO_5 + 5 equivs. C.

$$\left.\begin{matrix} 2\,(KO, NO_5) \\ 5\ C. \end{matrix}\right\} = 2\,(KO, CO_2) + 3\,CO_2 + 2\,N.$$

β Gas consisting of carbonic acid and nitric oxide.

2 equivs. KO, NO_5 + 3 equivs. C.

$$\left.\begin{matrix} 2\,(KO, NO_5) \\ 3\ C. \end{matrix}\right\} = 2\,(KO, CO_2) + CO_2 + 2\,NO_2$$

The latter process takes place only in a less degree together with the others.

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* *Oesterreich. Zeitschr. für prakt. Heilkunde*, June 6, 1856.

6. Carbonic oxide gas does not exert a decomposing action upon melted nitrate of potash; but in the nascent state, in a mixture of oxalate of potash and nitrate of potash, becomes oxidized to carbonic acid at a temperature at which oxalate of potash itself is quite stable.

7. For the preparation of chemically-pure nitrite of potash, the process of reducing nitrate of potash by charcoal is to be preferred to the method hitherto employed of calcining nitrate of potash by itself.

8. In the detection of small quantities of carbon by the formation of carbonate of potash, by means of fusion with nitrate of potash, an excess of the latter is to be avoided, as with an excess of nitre no carbonate of potash is formed, but only nitrite of potash.—*Abhandl. der Konigl. bayer. Akad. der Wiss.*

ON THE PRODUCTION OF MANNITE BY MARINE PLANTS.

BY T. L. PHIPSON.

When some marine Algæ are dried in the open air, they produce an efflorescence of mannite on their surface. Such are the *Laminaria saccharina, L. digitata, Rhodymenia palmata, Fucus siliquosus, F. nodosus, F. vesiculosus, F. saccharinus, F. serratus*, &c. The author has observed this production of mannite on many of these Algæ, and feels no doubt that all the Algæ which contain vegetable mucilage may give origin to this substance when placed in circumstances favourable to its production.

It has been supposed that the production of mannite by these plants was due to a *secretion* by the living plant; the author has ascertained that it is only produced after the cessation of the vital activity of the plant. He also thinks that the production of mannite is always the result of a peculiar fermentation, the effect of which is to deoxidize the vegetable mucilage, and convert it into mannite.

Many marine Algæ contain such large quantities of mucilage, that some naturalists have endeavoured to make use of this product in the arts. (Thus Brown (*Edin. Phil. Journ.*, xxvi., p. 409) found that by prolonged ebullition with dilute sulphuric acid this mucilage was converted into *arabine*.)

The author obtained considerable quantities of mannite by placing the sea-weeds, whilst moist, between sheets of brown paper, so that the access of air was not prevented, and leaving them thus for about eight days. Their surface was then covered by an efflorescence of mannite. In this case it is produced rather in a granular than a crystalline form; but when dissolved in water, it crystallizes, on the evaporation of the liquid, in tufts of long colourless needles.

The production of the mannite may take place as follows. Supposing the formula of the mucilage to be $C_{12}\,H_{10}\,O_{10}$, which represents the composition of the substance dried *in vacuo* at 266° F., by losing 1 equiv. of oxygen in the presence of water, it may split into 2 equivs. of mannite; thus—

$$C_{12}\,H_{10}\,O_{10} + 4\,HO = 2\,C_6\,H_7\,O_6 + O$$

Vegetable mucilage + water = mannite + oxygen.

Mannite is also produced during the viscous fermentation, in which a viscous matter of the nature of gum is formed (in wines, beers, and vegetable juices in course of alteration), and in this case the mannite is evidently produced by a deoxidizing action exerted by the fermenting matter upon the viscous substance.

The intercellular mucilage of a sea-weed being decomposed during the production of mannite, the superficial tissue of the plant is deteriorated; this is the case especially in the *Laminaria saccharina*, one of the Algæ which furnishes most mannite. With the microscope the latter is seen accompanied by a great number of isolated spherical cells, arising from the destruction of the tissues of the plant; the application of water dissolves the mannite and sets free the cells. In the frond, when there is no mannite on its surface, these cells are seen in juxtaposition and implanted in a mucilage, forming a smooth continuous layer, which becomes pulverulent by the formation of the mannite.

The body which causes the alteration of the mucilage in the Algæ is probably the albuminous matter which is contained in all vegetables, and becomes altered in the air, giving rise by its continued alteration to those disagreeable odours, which characterize the putrefaction of the Algæ.

The author therefore thinks that mannite is produced rather from vegetable mucilage than from sugar, and that wherever vegetable mucilage is subjected to a deoxidizing action mannite will be formed.—*Comptes Rendus.*

WRITING INK IN CAKES.

A. Leonhardi gives the following formula for ink which will admit of being sent to a great distance and at any time of the year with convenience of transport, and possessing at the same time all the requirements of an excellent article. The "ink-powders" hitherto found in commerce are not to be compared with it, for they not only possess a different composition, but never dissolve completely to form a clear solution in water, and their employment is attended with so many inconveniences and disadvantages, that they have been given up. Common black ink may indeed be evaporated to dryness, but it leaves a residue which does not again dissolve completely in water, and never furnishes a useful ink by this solution. The recipe for the preparation of the cake-ink is as follows:—

42 parts of Aleppo galls and 3 parts of Dutch madder are extracted with a sufficient quantity of hot water; the fluid is then filtered, 5½ parts of sulphate of iron are dissolved in it, and 2 parts of a solution of iron in wood vinegar, with 1½ part of solution of indigo are added to it. The mixture is evaporated to dryness at a moderate heat, and formed into cakes of a proper size (for instance, 5 inches long, 3½ inches broad, and ⅜ inch thick.)

1 part of this cake-ink dissolved in 6 parts of hot water, furnishes an excellent writing and copying ink; whilst even with 1 part of cake-ink and 10 to 15 parts of water, beautiful writing inks are obtained.—*Mittheil. des Gewerbevereins für das Königr. Hannover*, 1856, p. 246.

ON A METHOD OF IMPARTING A RED COLOUR TO BONE AND IVORY.

BY DR. J. C. KELLERMANN.

The bone to be coloured is laid for fifteen to twenty minutes in very dilute cold nitric acid of the strength of a good vinegar; this dilute nitric acid is obtained by mixing fully half a litre of soft water with about thirteen grms. of nitric acid. The bone is then immersed for fifteen to twenty minutes in a solution of protochloride of tin, made by dissolving a piece of the size of a lentil in a pint of water. The objects thus mordanted are then put into the following red-bath, which must first be heated until it begins to boil.

Red-bath.—For an experiment on the small scale, take three to five grs. of fine red carmine, pour to it ten or twelve drops of ammonia, and stir it up well until the carmine is dissolved, then add about two ounces of soft water. In this bath, when heated to boiling, the objects must be left for about fifteen minutes. The tints obtained are more vivid when the boiling of the bath is not continued whilst the objects are in it.

If it be desired to change the tint thus obtained (a very fiery carmine-red) to a more scarlet colour, one of the following methods may be employed. When the red-bath begins to boil, and immediately after the objects have been immersed in it, five to ten drops of tartaric acid of the strength of a good vinegar may be added; or the water in which the protochloride of tin is to be dissolved may be mixed with an extremely small quantity of English sulphuric acid.—*Dingler's Polytechn. Journal*, cxli., p. 67.

DECOMPOSITION OF SOLUTION OF ACETATE OF MORPHIA.

Sir,—An insertion of the following in next month's *Pharmaceutical Journal* may be of some benefit both to patient and prescriber. Having had occasion, during the last week, to make up a sedative draught for my brother according to the following prescription by a London surgeon—

℞ Liq. Morph. Acetatis, ℥ xx.
Spt. Æther. Nit., ʒss.
Aquæ ad ℥iss.
Ft. haustus h. s. s. si opus sit.;

I remarked that when the draught was first made up it was colourless and effective, but when it had been made a day or two it had acquired a straw colour (doubtless from the yellowing of the morphia by the free nitric acid in the spirit of nitre), and was useless. I found, on examining my spirit of nitre, that it was, as I had anticipated, very acid.

I would also notice the well-known fact that Liq. Morph. Acet. becomes brownish on keeping, as I remarked that a draught which was made in London from the same prescription, and which had a brownish but no yellow tint, was equally ineffective with mine, which had become yellow.

Now, seeing that the brownish draught did not assume a yellow tint on being kept, I presume the acetate of morphia must have been decomposed, or the nitric acid would have detected it, giving its characteristic colour.

As this browning of the solution is a common case, small quantities only should be prepared where little dispensing is done, and it should on no occasion be used even then if it have acquired the brown colour.

I am, sir, yours respectfully,

EDWARD WOOD.

31, *Richmond Place, Brighton, Feb.* 27, 1857.

Northern Circuit, Liverpool.

THE PECUNIARY VALUE OF HUMAN LIFE.

JUST at the time of going to press we observe the report of a case, Bramwell *v.* Lees. The action was brought by plaintiff for compensation for the loss of his daughter, nearly thirteen years of age, in consequence of taking laudanum supplied to her by defendant, a Chemist, by mistake, instead of tincture of rhubarb. The tincture was sold to the wife of the plaintiff, who brought a cup, and asked for two-pennyworth of tincture of rhubarb. She returned home, mixed the tincture with some sugar and warm water, and gave it to her daughter, who, in a few minutes, complained of numbness in the legs, sickness, and other symptoms. A medical man was sent for, but the patient died the next day, and it was proved that laudanum had been taken instead of tincture of rhubarb. Defendant had paid the doctor's bill and given £5, which plaintiff considered not enough. He estimated the value of his daughter's services at five shillings a week, which he expected to obtain on her attaining the age of thirteen. The jury found a verdict for the plaintiff; damages £15,—one shilling of it to the grandfather.

POISONING BY ARSENIC IN CHINA.

(CORRESPONDENT OF THE "TIMES.")

As we were writing our last advices, on the 15th inst., there was a report that an attempt had been made to poison a large portion of the community, arsenic having been mixed with the bread at one of the principal bakeries of the place. This proved to be the case, and several hundred people suffered from eating the bread; but we are happy to add we have heard of no fatal consequences, though many are still suffering from the effects. We believe it is agreed among the medical men that the consequences were not fatal, owing to the large quantity of arsenic used, which acted generally as a violent emetic. The head man of the bakery, known as Allum, left per steamer for Macao early in the morning of the day the occurrence took place. There was some delay on the part of Government in sending after him, but a foreign gentleman, a sufferer from the atrocious attempt, chartered a steamer, and succeeded in capturing Allum before he got on shore at Macao. He was brought back here, and his trial, with that of several of the men who were employed on the premises, comes on at the sessions now sitting.

Hongkong, Jan. 30*th.*

ROYAL INSTITUTION.

WITH the parliamentary and fashionable season in London commence the Meetings of the Royal Institution; and just as we look to the debates in Parliament for an indication of the prevailing political views of the day, so do we gather from the evening discourses in Albemarle Street what have been the direction and results of recent scientific investigations. The Friday Evening Meetings of the Royal Institution are the best attended, most fashionable, and aristocratic of our scientific reunions. They are attended by the most eminent men of every depart-

ment of science, who are surrounded by rank and talent of all grades—the more humble votaries of science seeking inspiration from exalted genius. Moreover, the character of the company influences that of the matter which from week to week is brought forward, for, in the presence of so many *savants*, mere popular illustrations of well-known facts, or anything common-place in the discourses, would meet with little encouragement; while, on the other hand, the accounts of the progress of science, which it is the immediate object of these meetings to give, are necessarily popularized, so as to render them intelligible to a mixed audience, a large proportion of which consists of patrons rather than professors of science. Hence it often happens that a subject, the dry scientific details of which had been received with cold reserve by some half a dozen or a dozen philosophers when first broached at a meeting of the Royal Society, will prove not only interesting, but highly popular, when dressed in the garb suited for the hundreds of ladies and gentlemen who throng the benches of the Royal Institution.

The meetings, as usual, commenced in the latter end of January, when they were opened, Jan. 23rd, by Mr. Tyndall, Professor of Natural Philosophy to the Institution, who delivered a discourse "On Glaciers." This was followed, on Jan. 30th, by the Rev. F. D. Maurice, "On Milton, considered as a Schoolmaster." On Feb. 6th, Dr. J. H. Gladstone took as his subject "Chromatic Phenomena exhibited by Transmitted Light." The lecturer explained and illustrated the results of an investigation in which he has been for some time engaged, showing that when a ray of light passes through a coloured solution, and is then analyzed by a prism, the resulting spectrum varies according to the nature of the coloured solution used, all the compounds of a particular base or acid having the same effect upon the light and producing the same description of spectrum. In this way he considers that the presence or absence of certain substances in solution may be indicated by the prism, and that this may prove a valuable aid to the ordinary processes of analysis in ascertaining the composition of bodies. On Feb. 13th, Mr. T. A. Malone delivered a discourse "On the Application of Light and Electricity to the Production of Engravings, comprehending a description of Photogalvanography." It was the object of the lecturer, in this communication, to explain a process which has recently attracted much notice, by which engravings are produced from photographic pictures by the application of electricity. The subject on Feb. 20th was "The Relation of Science to Ornamental Art," which was introduced by Mr. C. Dresser. On Feb. 27th, the chair was occupied by PRINCE ALBERT, and a discourse was delivered

ON THE CONSERVATION OF FORCE.

BY PROFESSOR FARADAY.

The object of this communication appeared to be to state certain difficulties which the author had experienced in reconciling the received definition of the force of gravitation with the principle of the conservation of force as recognized and applied in reference to every other form of physical force. The author said:—

"There is no question which lies closer to the root of all physical knowledge than that which inquires whether force can be destroyed or not. The progress of the strict science of modern times has tended more and more to produce the conviction that 'force can neither be created nor destroyed;' and to render daily more manifest the value of the knowledge of that truth in experimental research. To admit, indeed, that force may be destructible or can altogether disappear, would be to admit that matter could be uncreated; for we know matter only by its forces: and though one of these is most commonly referred to, namely, gravity, to prove its presence, it is not because gravity has any pretension, or any exemption, amongst the forms of force as regards the principle of *conservation*; but simply that being, as far as we perceive, inconvertible in its nature and unchangeable in its manifestation, it offers an unchanging test of the matter which we recognize by it.

"Agreeing with those who admit the conservation of force to be a principle in physics, as large and sure as that of the indestructibility of matter or the invariability of gravity, I think that no particular idea of force has a right to unlimited or unqualified acceptance, that does not include *assent* to it; and also to *definite amount* and *definite disposition of the force*, either in one effect or another, for these are necessary consequences: therefore I urge that the conservation of force ought to be admitted

as a physical principle in all our hypotheses, whether partial or general, regarding the actions of matter."

And again:—

"Supposing that the truth of the principle of the conservation of force is assented to, I come to *its uses*. No hypothesis should be admitted, nor any assertion of a fact credited, that denies the principle. No view should be inconsistent or incompatible with it. Many of our hypotheses in the present state of science may not comprehend it, and may be unable to suggest its consequences; but none should oppose or contradict it."

"If," says the author, "the principle be accepted as true, we have a right to pursue it to its consequences, no matter what they may be. It is, indeed, a duty to do so. A theory may be perfection, as far as it goes, but a consideration going beyond it is not for that reason to be shut out. We might as well accept our limited horizon as the limits of the world. No magnitude, either of the phenomena or of the results to be dealt with, should stop our exertions to ascertain, by the use of the principle, that something remains to be discovered, and to trace in what direction that discovery may lie.

"I will endeavour to illustrate some of the points which have been urged, by reference, in the first instance, to a case of power which has long had great attractions for me, because of its extreme simplicity, its promising nature, its universal presence, and its invariability under like circumstances—on which, though I have experimented and as yet failed, I think experiment would be well bestowed: I mean the force of gravitation. I believe I represent the received idea of the gravitating force aright, in saying that it is *a simple attractive force exerted between any two or all the particles or masses of matter, at every sensible distance, but with a strength varying inversely as the square of the distance.* The usual idea of the force implies *direct* action at a distance; and such a view appears to present little difficulty except to Newton, and a few, including myself, who in that respect may be of like mind with him.

"This idea of gravity appears to me to ignore entirely the principle of the conservation of force; and by the terms of its definition, if taken in an absolute sense, '*varying* inversely as the square of the distance,' to be in direct opposition to it; and it becomes my duty now to point out where this contradiction occurs, and to use it in illustration of the principle of conservation. Assume two particles of matter, A and B, in free space, and a force in each or in both by which they gravitate towards each other, the force being unalterable for an unchanging distance, but varying inversely as the square of the distance when the latter varies. Then, at the distance of 10 the force may be estimated as 1; whilst at the distance of 1—*i. e.* one tenth of the former—the force will be 100: and if we suppose an elastic spring to be introduced between the two as a measure of the attractive force, the power compressing it will be a hundred times as much in the latter case as in the former. But from whence can this enormous increase of the power come? If we say that it is the character of this force, and content ourselves with that as a sufficient answer, then it appears to me we admit a *creation* of power, and that to an enormous amount, yet by a change of condition so small and simple as to fail in leading the least instructed mind to think that it can be a sufficient cause: we should admit a result which would equal the highest act our minds can appreciate of the working of infinite power upon matter; we should let loose the highest law in physical science which our faculties permit us to perceive—namely, the *conservation of force*. Suppose the two particles A and B removed back to the greater distance of 10, then the force of attraction would be only a hundredth part of that they previously possessed; this, according to the statement that the force varies inversely as the square of the distance, would double the strangeness of the above results; it would be an *annihilation* of force—an effect equal, in its infinity and its consequences, with *creation*, and only within the power of Him who has created.

"We have a right to view gravitation under every form that either its definition or its effects can suggest to the mind: it is our privilege to do so with every force in nature; and it is only by so doing that we have succeeded, to a large extent, in relating the various forms of power, so as to derive one from another, and thereby obtain confirmatory evidence of the great principle of the conservation of force. Then let us consider the two particles, A and B, as attracting each other by the force of gravitation, under another view. According to the definition, the force depends upon both particles, and if the particle A or B were by itself it could not

gravitate, *i. e.* it could have no attraction, no *force* of gravity. Supposing A to exist in that isolated state and without gravitating force, and then B placed in relation to it, gravitation comes on, as is supposed, on the part of both. Now, without trying to imagine *how* B, which had no gravitating force, can raise up gravitating force in A; and how A, equally without force beforehand, can raise up force in B; still, to imagine it as fact done is to admit a creation of force in both particles, and so to bring ourselves within the impossible consequences which have already been referred to."

These quotations will serve to show the nature of the difficulty which the author experienced in the study of this subject. His views were fully explained and illustrated by reference to numerous phenomena in physical science, tending to show that, excepting in the case of gravitation, evidence was always obtained in favour of the conservation of force.

Having thus stated his difficulty, the author proceeded to say:—

"It will not be imagined for a moment that I am opposed to what may be called the *law of gravitating action*—that is, the law by which all the known effects of gravity are governed; what I am considering, is the definition of the *force* of gravitation. That the result of one exercise of a power may be inversely as the square of the distance, I believe and admit; and I know that it is so in the case of gravity, and has been verified to an extent that could hardly have been within the conception even of Newton himself when he gave utterance to the law: but that the *totality* of a force can be employed according to that law I do not believe, either in relation to gravitation, or electricity, or magnetism, or any other supposed form of power."

Unfortunately the subject was left in this unsatisfactory position, no new light being thrown upon it calculated to dispel the doubts or remove the difficulties to which reference had been made. But we may hope that the statement made is but the prelude to further and more successful investigations, which may afford means of reconciliation between the definition of the force of gravity and the principle of the conservation of force.

BOOKS RECEIVED.

Floræ Capensis Medicæ Prodromus; or, an Enumeration of South African Plants used as Remedies by the Colonists of the Cape of Good Hope. By L. Pappe, M.D. Second Edition. Cape Town: 1857. 8vo. pp. 54.

Since its first appearance in 1850, this little work has undergone considerable improvement; several articles of the Cape Materia Medica not included in the first edition have been added, and a more detailed account of the uses of some has been introduced. The entire work now forms a very useful and interesting little manual of the medicinal plants occurring in the colony.

Few Cape drugs are employed in this country; but respecting these few, we naturally look to Dr. Pappe's book for information. In the case of Buchu Leaves, however, of the botanical origin of which we hoped to have found a precise account, our author does not give us much satisfaction. *Diosma crenata* De C. he cites as affording Buchu Leaves of the best quality, adding that *D. serratifolia* Lodd. and *Empleurum serrulatum* Sol. yield inferior varieties of the drug. Now in England the most esteemed Buchu Leaves are those afforded by *Barosma crenulata* Hook. and *B. serratifolia* Willd., and a less esteemed sort, those of *Barosma betulina* Bartl. As for the leaves of *Barosma crenata* Kuze (*Diosma crenata* De C.) we are not certain to have ever clearly identified them; and *Empleurum serrulatum* Ait. we have certainly never found at all, although we have looked for it repeatedly.

With all defects, however, Dr. Pappe's little work is a useful contribution, and one which we should be glad to see imitated in many other of our colonies.

Elements of Chemistry, Theoretical and Practical. By William Allen Miller, M.D., V.P.R.S., Professor of Chemistry in King's College, London.

This work will be noticed in our next number.

On Pepsine. By M. Boudault. Translated by W. Stevens Squire, Ph.D. London: Printed by C. Whiting, Beaufort House, Strand. 1857.

Epidemic Cholera, Diarrhœa, and Dysentery; *pointing out an Effectual and Expeditious Method of Cure, &c.* By Henry Jeanneret, M.D., &c. London: George Philip and Son, Fleet Street. 1857.

TO CORRESPONDENTS.

A. D.—(1.) We cannot find any notice of a patent granted to Jackson for the preparation referred to.—(2.) Thomas's *Practice of Physic.*

A. (Evesham).—The equivalents of the chemical elements given in Phillips's *Translation of the London Pharmacopœia of* 1836, which, we presume, is the work alluded to, are generally, but not entirely, those now in use by chemists.

J. L. (Bedford).—The discrepancies existing in different books in the statements of the equivalents of chemical elements, arise from two causes. First, there are slight discrepancies arising from differences in analytical results; the numbers being from time to time altered, in accordance with what are considered the most reliable results. Secondly, there are discrepancies—and these are more considerable in amount—arising from differences of opinion with reference to the constitution of chemical compounds. Thus, while some chemists consider the equivalent of mercury to be 100, others represent it as 200. The former chemists think that red oxide of mercury is a protoxide, consisting of one atom of mercury and one of oxygen; the latter think it is a binoxide, consisting of one atom of mercury and two of oxygen.

A. P. S. (London).—When sweet spirit of nitre has become acid, it is sometimes rectified from neutral tartrate of potash, which is preferred to calcined magnesia.

Inquisitor (Winslow).—In the mixture alluded to, the morphia would be precipitated in the state of a carbonate.

C. B. (Leeds) suggests that yellow bottles should be used for preparations which require to be kept from the light, the blue bottles sometimes used not answering the purpose. [The objection has been noticed before.]

B. A. (Lynn).—Balfour's *Manual of Botany.*

M. P. S. (Cambridge).—See page 488 of our last number.

J. R. (Spalding).—*Electro-magnetic Machine.* See vol. xii., page 333.

R. H. (Castle Hedingham) cautions country Members against a person travelling under the name of Wolfenberg, and selling a "Vermin Killer" under false pretences.

Acacia.—Liquid gum, if made with cold water, is not so liable to become acid.

M. P. S. (Brighton).—*Rosin Oil.* See vol. xii., pp. 345 and 389.

Heinrich (Wellingborough).—Yes.

T. (Ramsey).—(1.) We are not acquainted with the dose of *cyanuret of morphia.*—(2.) No.

A Student.—*Amylene.* See page 427 of our February number.

M. P. S. (Sunderland).—The price of the Prize Microscope of the Society of Arts is three guineas.

Belmont (Carlisle).—Glycerine should be free from smell, and about the same density as syrup.

R. M. (Guildford).—A small pocket microscope is sold by Pillischer, 88, New Bond Street.

F. W. (Sawbridgeworth).—We are unable to give the formula for Stedman's powders.

M. P. S. (London).—*Liquor Taraxaci* is generally prepared as follows:—℞. Expressed juice of taraxacum, three parts; rectified spirit, one part; mix, and allow the mixture to stand for twenty-four hours. Then decant and filter.

Botanicus (Warrington) is advised to study Botany, and take the chance of another prize being offered next year.

E. G.—The advertisement has been received, and will be used when an opportunity occurs.

M. P. S. (Putney).—We have no copy of Mr. Rawlings's formula for ginger beer.

J. W. (Nottingham).—(1.) No.—(2.) The nature of the change has not been accurately investigated, but it appears probable that margarine and mucilage are precipitated.—(3.) To render the decoction more purely demulcent.

ERRATA.—Page 459 of our last number, line 17 from bottom, *for* Mimosæ, *read* Mimoseæ; last line, *for* Carthartocarpus, *read* Cathartocarpus; page 460, line 19 from top, *for* Astragalus vera, *read* Astragalus verus.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. CHURCHILL, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. XI.—MAY 1st, 1857.

MEDICAL AND PHARMACEUTICAL JURISPRUDENCE.

The avowed object of the laws relating to Medicine and Pharmacy is the protection of the public against the evils of ignorance and fraud. The special purpose of each law is usually recited in the preamble, in which it is affirmed to be expedient for the "safety," "protection," or "advantage" (as the case may be) of the public that certain provisions should be enacted. Yet it is worthy of remark, that an extraordinary diversity exists in the mode in which it is sought to attain the same object in different countries, and even in different localities in the same country. This diversity may arise in part from the comparative estimates of the value of human life by the several parties concerned; but chiefly, we think, from the different degrees to which the theory of legislation is reduced to practice.

The law in France on these subjects is theoretically and practically more complete than it is in this country. Every person who prescribes or dispenses medicine must be educated and licensed for the particular duty which he undertakes. All medicines must be prepared according to the authorized Codex, and any deviation from this routine in any department of the profession is an offence directly punishable by law. It is not necessary to prove that a patient has sustained injury, or that a medicine has disappointed the prescriber by its defective quality; it is sufficient that an unlicensed person has performed an act for which a license is required, or that a medicinal preparation has been sold under a name which it does not correctly represent. The legal process is summary, and the evasion of the punishment difficult.

The French journals not unfrequently contain reports of cases; and the following examples, from the *Journal de Chimie Médicale*, will illustrate the stringency of the law against the irregularities to which we refer.

On the 14th of November, 1856, the members of the medical jury seized at the house of M. L——, Pharmacien at Merville, a quantity of a preparation represented to them to be "sirop antiscorbutique." The examination of this syrup proved that it had not been prepared according to the formula of the Codex. The proportion of wine was much less than that prescribed, and the flavour indicated that it had been prepared by cold maceration, instead of being distilled. These deviations enabled the maker to sell it at a much lower price than the genuine syrup.

M. L—— pleaded that he had received the syrup ready prepared from M. B——, Pharmacien at Lille, who was therefore summoned to the police court, on the charge of having fabricated and prepared a "sirop antiscorbutique" not in accordance with the formula of the Codex for this medicine, and in contravention of the 32nd article of the law 21 germinal (an xi.) of the ordonnance of 8th August, 1816, and the Act of Parliament of Paris of 23rd July, 1748.

The accused at first said that he had prepared the syrup according to *L'Officine*, a standard work by Dorvault. Then he maintained that he had sold it in the capacity of a Druggist, and not as a Pharmacien. He also pleaded some points of law in his defence, contending that the law under which proceedings had been taken was repealed by a subsequent one. The tribunal did not entertain the plea founded on a legal technicality, but maintained that the old law, enforcing obedience to the order of the Codex, was in full force. The plea that the original vendor was merely a Druggist, was not admissible; for in that capacity he could not legally prepare any medicinal compound, his functions being restricted to the sale of simple drugs. The tribunal therefore inflicted a penalty of 500 francs, with the costs of the process.

The *Journal de Chimie Médicale* for March, contains a report of the seizure of a number of medicines and preparations badly prepared or deteriorated. Several bottles containing distilled waters were found to consist either of common water,

or of plain distilled water, without any of the aromatic principles of the herbs or flowers indicated on the labels. Another preparation, "sirop de quinquina," was proved by several tests to be very defective. A jar, labelled "Sel d'Epsom," was found to consist chiefly of sulphate of soda. The Court sentenced the party to fifteen days' imprisonment, and a fine of 50 francs.

Several cases are reported in which fines of fifty francs, with three days' imprisonment, were inflicted for the adulteration of coffee with chicory.

The power of visiting shops with a view of ascertaining the quality of medicines and punishing delinquents, nominally exists in this country. This power is vested in the College of Physicians, and is limited to a certain district of the metropolis. The Society of Apothecaries has also a very limited authority over the shops of Apothecaries. But these provisions for the safety of the public have become practically obsolete, and even as originally contemplated, their operation was so partial and limited as to be worse than useless.

It is a notorious fact, that flagrant violations of the law are prevalent in all branches of the profession, because there is no responsible party upon whom devolves the duty of taking proceedings, and almost every case that has come to our knowledge in which legal proceedings have been undertaken, has originated not in the impartial endeavour to promote the ends of justice, but in some personal rivalry between the defendant and the instigator of the suit. Several striking instances of this fact have been reported in previous numbers of this journal.

A curious case came under our notice lately. A poor man having cut his head, sent his wife to a Chemist for some plaster. She requested the Chemist to call and apply it, which he did, as an act of charity, making no charge. A day or two afterwards the wife requested the Chemist to call again and see her husband, and finding the cut inflamed, he urged her to send for a medical man. The patient being poor the Chemist requested a medical friend to call, and this gentleman handed over the case to the parish doctor, who attended until a cure was effected, which occupied two or three weeks. This latter gentleman, whose dispensary is situated within a few doors of the Chemist, represented to the patient that, by bringing an action against the Chemist for unskilful treatment in the first instance, he would recover compensation for loss of time during his illness; and an attorney was accordingly instructed to write a letter, giving notice that proceedings were about to be commenced. We have not heard the result.

In the case of which a brief report will be found in another part of this number, in which arsenic had been accidentally mixed with arrowroot, it was proved that the defendant, a grocer, was in the habit of keeping parcels of rice, oxalic acid, corrosive sublimate, jalap, &c., in the same drawer, under the care of an ignorant boy. Yet no remedy existed for this culpable negligence, nor would the fact have been noticed if a fatal accident, followed by an inquest, had not brought it to light.

When the notoriety of an inquest brings a question, involving culpable ignorance, negligence, or criminality before a jury, there is much inconsistency in the mode of estimating the degree of guilt or the amount of damage. In some Courts it has been stated, as an extenuating circumstance, that the defendant is an unqualified person, and therefore could not be expected to know any better. In other places such incompetence has been held to be an aggravation of the offence, the party having taken upon himself a responsibility for which he was not legally qualified.

In a case briefly noticed in our last number, in which a child was poisoned by laudanum, sold by mistake, the jury estimated the value of the child's life by the weekly price of her labour. This being stated to be five shillings per week, the damages were computed, at so many weeks' purchase, to amount to £15, and as the family resided with the grandfather, one shilling of the amount was awarded to him as his supposed proportion of injury from the loss of a tenant.

The mode in which sanitary regulations are enforced by the authority of medical officers of health under the recent Act for the removal of nuisances, is found in some localities very successful, and the principle might with advantage be carried out to a greater extent in analogous cases.

THE APPROACHING ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

The legal difficulties and disputes which formerly gave rise to some fresh source of excitement at each Annual Meeting having now passed away, the circumstance chiefly to be apprehended is, that the Members may fall into the opposite extreme of apathy or indifference, under the impression that there is nothing more to be done. This is the natural course of events; and it was in anticipation of such fluctuations in the barometer of the Society, that, when the clause of the Pharmacy Act relating to the votes for Members of Council was framed, the London Members were purposely excluded from the privilege of voting by proxy or by voting-papers. Had this privilege existed at the present time, it is probable that our ensuing Annual Meeting would have been less numerously attended than its predecessors. We have heard several London Members complain of the trouble of attending the meeting merely for the purpose of voting; from which we infer, that, if they could have sent their votes by post, they would have neglected a public duty. It is a mistake for each Member to suppose that because he is a unit his absence will not be felt, for the meeting being composed of units, the prevalence of such an impression might reduce the meeting within a very narrow compass. It should also be remembered that subjects sometimes arise on the reading of the Annual Report which lead to interesting discussions. A country Member may have a grievance which has been bottled up for months, and the Annual Meeting affords a safety valve for relieving his mind from the pressure. In this manner, valuable suggestions are sometimes submitted to the Members, and, after due discussion, some amendment in the laws or regulations of the Society may be the result.

It was in consequence of a suggestion at one of the Annual Meetings, that the attendance of each Member of Council is now regularly reported, prior to the election of the Council for the ensuing year. In forming judgment on this return, due allowance should be made for circumstances, such as the locality or the state of health of individuals, &c. We regret to observe the non-attendance of our old and valued friend, Mr. Gifford, who is not a candidate for re-election, but who was one of our most regular attenders, until his declining health obliged him to relax in this duty. We are glad to observe among the new candidates, the name of Mr. Meggeson, one of the founders and constant advocates of the Society. In reference to the attendance of the Country Members of Council, it should be remarked that it is not necessary, or indeed desirable for those who reside at a great distance from London, to attend regularly.

It is, nevertheless, very important, that such places as Edinburgh, Liverpool, Manchester, &c., should be represented in the Council, and that towns of secondary magnitude should be represented in turn, so as to extend the interest in the proceedings of the Society to all parts of the country. If those who reside at a considerable distance attend twice or three times in the year, this is quite sufficient, with occasional correspondence, to maintain the desired equilibrium; and as the business to be transacted at each meeting is notified on the summons, the Members have an opportunity of selecting those meetings at which their presence is most required.

While the representation of the country in this manner is a valuable element in the constitution of the Society, it should be borne in mind that the preponderance ought to be in favour of the London Members, otherwise the amount of labour would become so great as to be attended with some inconvenience. We may state from experience, considering the number of Committees and the frequency of meetings on various subjects, that with less than fourteen London Members of Council, the business of the Society could scarcely be efficiently conducted without undue pressure upon those who bear the burthen.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in April.

MAJOR EXAMINATION.

Atherton, John Henry.....Liverpool
Dixon, Henry .....Grantham
Eyre, Joshua James.....Manchester
Featherstone, John Peter .....London
Glass, John .....Ryde
Richardson, John George Frederick, Longton
Rowell, Charles Frederick .....Uppingham
Sarsfield, William.....Durham

MINOR EXAMINATION.

Chrispin, William .....Sand Hutton
Hallaway, John .....Carlisle
Harrow, Henry.....Tunbridge Wells
Judd, William .....Brighton
Lee, John William .....London
Pepper, Adolphus .....London
Tieftrunk, Julius.....London
Tuck, John .....Trowbridge

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Bell, Alfred	Mr. Noakes	Brighton
Brown, Edward	Mr. Dutton	Birkenhead
Davies, Robert John	Mr. Roberts	Aberystwith
Machon, Edward	Mr. Parkes	Manchester
Syer, John Witham	Mr. King	Soham
Truman, George F.	Mr. Wellington	Oakham
Watson, Richard T.	Mr. Dobinson	Bishopswearmouth

PHARMACEUTICAL MEETING,

Wednesday, April 1st, 1857,

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

The following donations were announced:—

Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Insecta Britannica, vol. iii., from Mr. John Clifford.
Butterflies of Great Britain, from Mr. John Clifford.
Westwood *On Insects*, 2 vols. 8vo, from Mr. John Clifford.
Wood's *Index Entomologicus*, 8vo, from Mr. John Clifford.
Entomologist's Companion, from Mr. John Clifford.
Entomologist's Annual, 3 parts (55, 56, 57), from Mr. John Clifford.
Moore's *British Ferns*, from Mr. John Clifford.
Medical Literature, by Dr. Dobell, from the Author.
Archives du Museum (tome ix.), from the Author.
Le Quinquina Rouge, by M. Guibourt, from the Author.
The Quarterly Journal of Dental Science, from the Proprietors.
A specimen of Vanilla Fruit from the Mauritius, from M. Pouperiel de Valancé.

DETECTION OF STRYCHNINE WHEN ADMINISTERED IN DOSES LESS THAN SUFFICIENT TO CAUSE DEATH.

Dr. Garrod said that, having seen in the *Pharmaceutical Journal* that the question had been discussed, at a recent meeting of the Society, whether strychnine could be detected in the urine of a patient to whom the alkaloid had been administered in quantity less than sufficient to cause death, he wished to mention a case which had occurred within his own observation. Having a patient at the hospital to whom strychnine was administered in doses of one-eighth of a grain three times a day (the quantity having been increased up to this point), the urine of twenty-four hours was collected and examined by Mr. Rodgers's process, and most satisfactory evidence of the presence of the strychnine was obtained. In this case the strychnine was given in medicinal doses, and it was therefore one of those cases in reference to which it had been stated that the alkaloid could not be detected.

Mr. A. F. Haselden brought before the meeting the subject of

THE PREPARATIONS OF ARSENIC EMPLOYED IN MEDICINE.

In introducing this subject, he said he had nothing new to offer with reference to the medicines he was about to notice, but he thought some benefit might result from a discussion of the relative merits of the different compounds or preparations of arsenic used in medicine, with the view of eliciting the opinions of those present as to which of them ought to be ordered in our Pharmacopœia. At present there were only two preparations of arsenic in the London Pharmacopœia, while there were several others frequently used in medicine, and ordered in other Pharmacopœias. He proposed briefly to describe or refer to the principal arsenical compounds in use, so as to bring the subject fairly before the meeting, and present the points upon which the expression of opinion was desired.

Liquor Potassæ Arsenitis, of the London Pharmacopœia, claimed the first notice, from the fact of its having maintained its position through several generations of Pharmacopœias, and of its being more generally used by English medical practitioners than any other arsenical preparation. By many medical men this was the only preparation of arsenic ever prescribed, but whether this circumstance arose from their considering it superior to all the others, or from their being unwilling to try the effects of any new preparations of so powerful an agent as arsenic, he was unable to say. There appeared to be a difference of opinion as to whether this preparation was rightly called an arsenite of potash or not, some persons contending that the old name of *Liquor Arsenicalis* was a more correct one.

Liquor Arsenici Chloridi had been introduced into the London Pharmacopœia of 1851 for the first time. It was understood to be intended to represent an old preparation, known as De Vallenger's mineral solution. It was a solution of 1½ grain of arsenious acid with a little hydrochloric acid in one ounce of water. This and the preceding preparation constituted the only compounds of arsenic ordered in the London Pharmacopœia. Being both in the liquid form, it was to be regretted that they were not of the same strength.

Among the preparations not contained in the Pharmacopœia, there were—

Liquor Sodæ Arseniatis (Pearson's Solution), and *Liquor Ammoniæ Arseniatis*. These were solutions of either salt, in the proportion of four grains to the ounce; being the same relative strength as the Liquor Potassæ Arsenitis, over which it was questionable whether they possessed any advantage.

Arsenici Iodidum, or, as it was sometimes called, *Arsenici Teriodidum*, was ordered in foreign Pharmacopœias, where instructions, not all alike, were given for its preparation. This compound was sometimes used in this country, although not recognized in our Pharmacopœias. A solution of two grains to

an ounce of water was found to keep without change, but in a stronger solution a precipitate formed. The author stated that he had tried both glycerine and sugar for preventing the decomposition and precipitation which occurs in the stronger solution, and found sugar to succeed better than glycerine. He had also obtained a similar result with iodide of iron.

Liquor Arsenici et Hydrargyri Hydriodatis, or, as it was sometimes called, *Donovan's Solution*, had been used to some extent, and a formula for it was now given in the Dublin Pharmacopœia. Several modifications in the process for its preparation had been suggested since it was first introduced by Mr. Donovan. The most simple process was that of the United States Pharmacopœia, where iodide of arsenic and red iodide of mercury were directed to be rubbed together with water, and the solution completed by the application of heat.

Quinæ Arsenias, and other compounds of quinine and arsenic, were sometimes ordered in medicine, but there were no formulæ for their preparation in any of the Pharmacopœias.

Ferri Arsenias, obtained in the form of a dirty green precipitate, on adding arseniate of soda to sulphate of iron, was the last of these preparations to which he would refer.

Having thus brought the different medicinal preparations of arsenic under notice, he thought it worthy of consideration whether any of them, not at present contained in our Pharmacopœia, ought to be introduced there. Arsenic was described by medical writers as a valuable remedial agent, especially for skin diseases and for ague. In the Pharmacopœia of the Hospital for Diseases of the Skin, there were no less than seven different preparations containing arsenic, ordered for internal administration. He might also refer to the popular use said to be made of arsenic in some parts of Lower Austria, where, according to the late Professor Johnstone, it was extensively used by the common people, with the view of improving their personal appearance.

The author concluded with the following remarks: "To return to our subject, would it be advisable to add any of the preparations I have noticed to the future Pharmacopœia? Differences of opinion no doubt exist with reference to this question, and on this account I have introduced the subject for discussion here. It may be urged that the profession have the simple substances and can unite them as they please, but, on the other hand, it is well known that few remedies are much employed until introduced in some well-defined and manageable form. Again, it may be said, that if every preparation used in medicine were introduced into the Pharmacopœia, this work would be rendered too voluminous; but I think that a work for the guidance of every branch of the profession, from the Physician to the Pharmaceutist, cannot contain too large an amount of instruction and information up to the latest date, for it would be far more convenient to refer to one volume for the information required, than to have to search through many works, including journals and pamphlets."

Mr. Bell said the object of the communication which had just been read appeared to be to extend the use of arsenic. On a former occasion, when the subject of arsenic was discussed there, the object had been to restrict its use. It was certainly desirable that the Pharmacopœia should contain the best preparations for its administration, but not, he thought, that the number of such preparations should be multiplied.

Mr. Hanbury thought, judging from prescriptions in which arsenic was ordered, that there was no occasion for any other preparation than the old liquor arsenicalis, as the use of the other preparations was confined to a very limited number of medical men.

Dr. Garrod perfectly agreed with Mr. Hanbury. He thought that one good preparation of arsenic was sufficient, the effect, as far as the arsenic was concerned, being the same whatever its state of combination might be. Liquor potassæ arsenitis answered the purpose very well, as also did the liquor arsenici

chloridi of the London Pharmacopœia. He had given both to the same patient, and could not detect any difference in the effects, but he thought, if both were retained in the Pharmacopœia, the strength ought to be equalized. He believed the arsenic existed in both preparations as arsenious acid, which was simply dissolved, in one case in solution of carbonate of potash, and in the other case in hydrochloric acid.

Dr. Normandy mentioned some cases, which seemed to show that the effects of arsenious acid were not always to be depended upon.

Mr. Redwood had been glad to hear the opinion expressed by Dr. Garrod, with whom he entirely concurred. He thought there could be no doubt that the two preparations of arsenic of the London Pharmacopœia contained the arsenic in the same state, namely, as arsenious acid, but associated with different solvents, carbonate of potash being used for this purpose in one case and hydrochloric acid in the other. The latter of these seemed least liable to objection, as the medicine would be likely to meet with free hydrochloric acid in the stomach. If, in liquor arsenicalis, the arsenious acid required the carbonate of potash to increase its solubility, this effect would necessarily cease when it came into the acid contents of the stomach.

Dr. Radcliffe wished to remark, with reference to the allusion which had been made to the use of arsenic in Austria, that there was reason to believe the accounts published in this country, which had excited so much astonishment, were not correct, and that no such practice existed as that described by the late Professor Johnstone in his popular work on Chemistry.

Mr. Bell referred to the practice among grooms of giving arsenic to horses with the view of improving their coats and general appearance, which seemed to strengthen the assumption that it might be used for a similar purpose by human beings.

KNIGHT'S SODA WATER APPARATUS FOR AERATING LIQUIDS.

These machines were brought before the notice of the meeting, their various parts exhibited, and their construction fully explained, by the inventor and patentee, Mr. Richard Knight, of Foster Lane, London. They are made of three sizes: half-gallon, or table size, as represented by fig. 1; two gallon and four gallon sizes, as represented by fig. 2. The materials of which they are constructed consist of pure tin and silver, which renders a contamination of the aerated water with any foreign ingredients an impossibility. The manufacture is simple and solid, and the manipulation required in working them is exceedingly easy, so that all fear of derangement is removed, and durability ensured; at the same time, should they meet with any accident, they are easily and cheaply repaired.

Fig. 1.

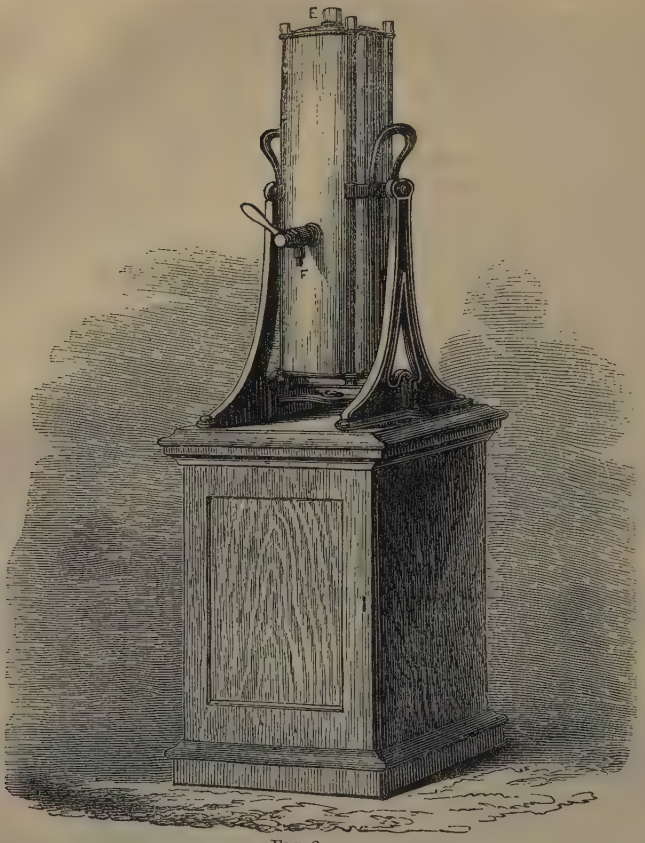

FIG. 2.

The time required for bringing the aerated water to perfection by either of the apparatus is half an hour. Figs. 3 and 4 show the process of agitating the

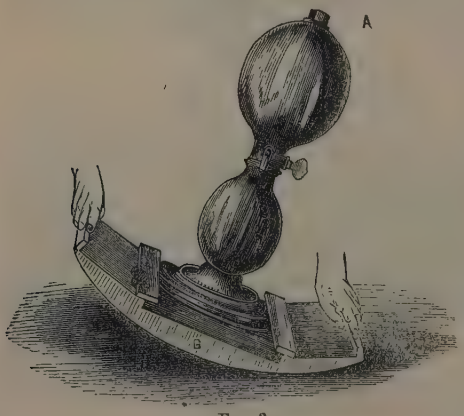

FIG. 3.

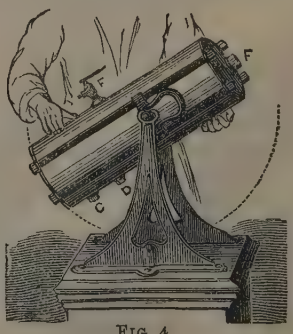

FIG. 4.

machine, so as to ensure a complete absorption of the carbonic acid gas, which, owing to the great solidity of the manufacture, is capable of being condensed under considerable pressure with perfect safety. This mode of agitating or breaking the water during the evolution of the carbonic acid gas is of so thorough and complete a kind, that the absorption of gas obtained is greater than is effected by any other process.

The soda water, when made, may either be drawn off at pleasure, as from a fountain; bottled off at the rate of twenty to thirty dozen per day; or retained in the machine for weeks or months together, without any fear of deteriorating in quality. No movement or agitation can interfere with the working of the machines, so that they can be used at sea on board any vessel with the same certainty of success as on land. They can also, when charged, be conveyed from place to place without any fear of derangement. The two-gallon and four-gallon machines, mounted on a pedestal with cocks, as shown in fig. 2, can be easily wheeled from one part of a room to another.

The construction of these machines appeared to be generally approved by the Members who examined them. It was suggested that they should be exhibited in operation at the Conversazione in May, when Members would be able to judge of their effects.

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

The last Meeting for the present Session of the Pharmaceutical Society in Edinburgh was held in the rooms, 50, George Street,

MR. W. FLOCKHART, VICE-PRESIDENT, IN THE CHAIR.

DESCRIPTIVE NOTICE OF SOME FRENCH PHARMACEUTICAL SPECIALITIES,

WITH SPECIMENS PRESENTED TO THE SOCIETY BY MR. D. S. KEMP, ASSOCIATE, AND RESIDENT IN PARIS.

Communicated by Mr. H. C. Baildon.

Thinking it probable that Mr. Kemp, from the favourable position occupied by him in Paris, might be able to contribute some interesting information connected with French pharmacy, I some time since wrote to him on the subject. In reply, he promised to do so; and, in February, I had a letter from him, in which he says: "The usual pressure of business at this season has prevented me fulfilling my promise until now of sending you some matter or other for communication to the Pharmaceutical Society; I hope, however, it is not yet too late for the season. Finding it quite out of my power at this time to get up anything like a scientific article, I have sent one or two specimens of French Specialities, with a written notice of each, which may possibly interest some of the members of the Society." He continues: "I am really sorry that I have not been able to send you something more deserving of your attention; but I think I may promise you some matter possessing the merit of originality, if I am spared till next session." In continuation, he writes:

"This communication is not intended as more than a descriptive notice of the few specimens of French Pharmaceutical Specialities which it accompanies. These are only a selection of the most elegant, from a vast number of others well known in France, and many of which are a source of no little pecuniary gain to their proprietors.

"Those of the selection in the form of pills are three in number; two of them preparations of iron, and the third of digitaline.

"The 'Pilules de Vallet,' or Vallet's Pills, contain the proto-carbonate of iron in a perfect state of preservation. This is effected by the following process:—The sulphate of iron and carbonate of soda are dissolved in water containing a sixteenth of its weight of simple syrup; the precipitate, washed with water and syrup in the same proportions, and expressed in a cloth saturated with syrup, is well mixed with

honey, and evaporated to a proper consistence for pills; the pills are afterwards silvered and kept in bottles, and contain each about a quarter of a grain of protocarbonate of iron along with a little inert powder. They are beautifully finished, and preserve their shape for any time.

"The 'Pilules de Blanchard' contain the protoiodide of iron. They are prepared by evaporating a solution of iodide of iron (prepared in the usual way with iodine and iron filings) along with honey to a thick consistence, and forming a mass by the addition of a little marsh mallow and liquorice powder. In the process, the greatest care is taken to prevent the decomposition of the iodide; the pills are rolled in powder of iron and on an iron-pill machine, and are finally varnished with a solution of balsam of tolu in ether. Each pill contains one grain of protoiodide of iron and a sixth of a grain of metallic iron.

"The granules of digitaline form a convenient method of administering that powerful medicine, each containing one milligramme ($\frac{1}{60}$th of a grain) of digitaline, mixed with powdered sugar.

"The 'Dragées (or Bonbons) de Gille' contain also the protoiodide of iron, about one grain in each. It is contained in a pill in the centre of the dragée.

"The method of their preparation is too obvious to require explanation. It is a form of medicine more suited to the French than to the British taste.

"The next form of medicine shown in the specimens is the most elegant of all.

"The 'Perles d'Ether' and 'Perles de Terebenthine,' are small gelatine capsules, containing respectively pure ether and turpentine; they are prepared by a process kept secret by the proprietor, and are of unequalled beauty and finish; each contains from four to five minims of sulphuric ether or oil of turpentine.

"The capsules of Mathey-Caylus and Raquin are both very fine illustrations of the perfection to which the process of capsulation has been brought.

"Those of Raquin contain copaiva thickened with $\frac{1}{3\frac{1}{2}}$ of its weight of magnesia, and those of Mathey-Caylus are prepared with pure copaiva, copaiva and citrate of iron, copaiva and cubebs, and five other combinations of the same medicine, as well as Venice turpentine.

"The specimen sent contains copaiva with citrate of iron, a very useful combination.

"The capsules of both makers are composed of gluten from oat flour, not gelatine.

"If some of these preparations were manufactured by English or Scotch Pharmaciens, they would probably obtain a reputation equal to that which they hold in France.

"*6th February*, 1857." "D. S. Kemp.

ON AN IMPROVED METHOD OF COATING PILLS.

BY MR. BAILDON.

I think, Sir, that you will agree with me, that these specimens are very interesting, and that they demonstrate how very far our ingenious neighbours are before us, even in the mechanical part of our profession. I have never before seen anything at all to compare with the elegance and beauty of finish manifested in the Perles d'Ether. The method of coating pills used by Mons. Blanchard might be applicable not only for all pills kept ready made for sale, but also modified in a way I shall immediately allude to, for pills made to prescriptions, not only to prevent them from hardening, but also most effectually to cover any unpleasant taste or smell. A solution of balsam of tolu in ether (Mons. Blanchard's method) I did not find sufficiently volatile, as pills coated with it took upwards of three hours to dry, but by using chloroform as the solvent in the proportion of a dram of the balsam to three drams of chloroform, twenty minutes was quite sufficient to make the pills non-adhesive. I have brought specimens of pills varnished with the two solutions named. The chloroform and balsam solution is not only preferable from the shortness of the time required to complete the process, but the pills have a much more finished appearance. The superiority of this method of preserving pills over any kind of powder, appears to me very great, and it is also certainly preferable to the coating of pills with silver leaf. It will, I am satisfied, be found more effectual in preserving pills soft as well as in covering the taste and smell of the drugs used.

Professor Christison states in the introduction to his Dispensatory, "A few years ago it was ingeniously proposed in France to cover pills with gelatine by dipping

them into a solution of bone-gelatine or isinglass. The method is troublesome, but otherwise answers well with most pills." The process just described is equally efficacious, and is attended with but little trouble.

The process was then shown. It consisted in placing a few drops of the solution in a suitable box, shaking the pills in it, and then turning them upon a slab, and so placing them that one pill did not touch another. In a few minutes they were quite dry.

The CHAIRMAN read a letter from the President (dated 28, Dundas Street, April 14, 1857) stating, that being still too much of an invalid to be able to attend the closing meeting of the Pharmaceutical Society for this session, he could not allow the opportunity to pass without expressing his great regret at having been prevented from attending to his duties as Chairman during the winter. He alluded to several papers of importance which had been read by various Members of the Society during the session; and ventured to predict that their number would ere long be considerably increased, being persuaded that there is a mine (as yet unexplored) where valuable materials may be worked out. He alluded especially to country Members and Associates. Many of them, he felt assured, were well able to furnish papers.

A paper was read by Dr. Stevenson Macadam, F.R.S.E., on the "Detection of Strychnine, with special reference to the recent wholesale Poisoning of Dogs in the neighbourhood of Perth." An interesting discussion followed the reading of this communication.

Dr. Macadam read the Report regarding the Examination of the Pharmaceutical Students who attended his winter course of Lectures on Chemistry, and stated Mr. Duncan McCabe, Apprentice to Mr. Macfarlan, as the successful candidate for both Prizes, viz., that for the best Essay on the Chemistry of Food, and the other for the best Answers to Written Queries. Mr. Flockhart then, in the name of the President, by whom these Prizes were given, handed them, with a short address, to Mr. McCabe. The volumes presented were Gray's "*Supplement*," by Redwood; and Thomson's "*Cyclopædia of Chemistry*."

The meeting was very numerously attended, and the proceedings of the evening appeared to give satisfaction to all present.

THE ANNUAL MEETING

Was held on the following day in the same rooms, at two o'clock,

MR. FLOCKHART IN THE CHAIR,

In the unavoidable absence of Mr. Robertson.

The SECRETARY, being requested, read the following Annual Report:—

The Council have now the pleasure of laying before this the Annual Meeting of the Pharmaceutical Society, a report of the affairs and progress of the Society in Edinburgh during the past year, and the Session now about to close.

Evening lectures on Chemistry were commenced by Dr. Stevenson Macadam, as advertised, in the Society's rooms early in November, 1856; but, as the number of pupils offering was small, Dr. Macadam made a proposal to the class to admit to his daily prelections in the School of Arts such students belonging to the Society as held his perpetual tickets, as well as all those who had determined to attend the evening course, and this on terms certainly very advantageous to them, and for which the Council think Dr. Macadam well entitled to the thanks of the Society. Of this kind offer eight of the Pharmaceutical students gladly availed themselves.

Early in the Session it was thought advisable to move the museum and lecture-room from 72, Princes Street, to 50, George Street. The Council think increased accommodation has thus been gained, while those who have attended any of the scientific meetings, or who may now be present, will be able to judge of the propriety of the change. By this removal there will be a saving in the annual rent; and it is proposed, in the course of the summer, to add considerably to the library and very probably to the museum, so as to keep up an interested feeling towards those two important branches of the Society in Edinburgh. It may further be men-

tioned, as the request of several members, that representations will be made to the Council in London regarding duplicate specimens, which must of necessity from time to time accumulate on their hands. Were such specimens transmitted to Edinburgh it is thought that, at very trifling expense, valuable assistance would be afforded in extending and improving the museum here.

The printed statements which have from time to time appeared in the Journal will best show what has been done at the different meetings held here during the winter months. There have been five scientific meetings, and, while the Council thank those gentlemen who have lent their aid and assistance, they hope next Session to be able to establish a regular series of monthly meetings, and thus increase the number during each Session to six. Members and Associates are strongly urged to contribute towards these reunions. Any suggestion for the extension or improvement of these meetings will be gladly entertained by the Council, and it will be gratifying to find from increased attendance that these meetings are viewed as opportunities for keeping up the harmony and good feeling existing in the Society, as well as evincing a desire on the part of its well-wishers to contribute towards the instruction of those connected with the association.

The thanks of the Society are tendered to those gentlemen who have taken charge of the Library and Museum.

The Council beg especially to draw the attention of Members to the fact, that at every sitting of the Board of Examiners, opportunity is afforded for Apprentices joining the Society as Registered Pupils, either by personal appearance before the Board in Edinburgh, or, in event of residing in the country, by certificate of classical attainments from a clergyman, or other party competent of judging. Six pupils have thus been admitted at the two last examinations, and the Council will be glad to find such candidates coming forward more abundantly, as they believe the chief support given in future to the Pharmaceutical Society must arise from young Pharmaceutists, who, it is hoped, will not fail to profit by the comparative facilities now afforded of becoming thoroughly acquainted with the scientific department of their business.

In reference to inquiries regarding the Register Fund Prize, the Council take this mode of intimating to the Associates and Apprentices of the Society throughout Scotland, that the same subject, namely, "*On the Best Mode of Preparing Tinctures*," is again fixed upon as the competing essay. All papers are therefore requested to be forwarded to the Secretary in Edinburgh, not later than the 1st of October; and it is hoped that the number and character of some of these essays will be such as to enable the Committee to award the Prize, which has now been in abeyance for the last two years.

The Council think this a fitting and good opportunity for drawing the attention of country Members generally to the inquiry lately made by the Highland Society of Scotland, as to whether the Council could recommend any Member of the Pharmaceutical Society, residing in agricultural districts, as possessing sufficient knowledge of Analytical Chemistry to enable them to examine and test, for the purpose of ascertaining the purity of such substances as guano, gypsum, nitrates of soda and potash, ammoniacal salts, oil cake, bone dust, superphosphate of lime, and other articles now so extensively employed by farmers and proprietors for the improvement of land. Impressed with the idea that much good might accrue, if some parties were found disposed to declare themselves willing and able to undertake these duties, the Council have taken steps to ascertain the feelings of the country Members throughout Scotland in reference to this matter, in the conviction that, under the auspices of the Highland Society, the present movement may become more important than might at first sight appear; and they therefore hope due attention will be paid to the circulars which have been so lately issued, as much will depend upon the nature of the replies received, whether anything can really be substantially done to meet the wishes of the Highland Society on the point now before the Council for consideration.

The following is a statement of the Secretary's intromissions with the funds of the Society, commencing 1st January, 1856, and terminating 30th December same year:—

Dr. *The Pharmaceutical Society in account with the Secretary.* *Cr.*

	£	s.	d.
To paid Insurance of Museum and Library	0	7	6
Do. Water Duty	0	5	6
Do. Rent of Rooms, less Taxes	22	18	2½
New Shelving, Furniture, &c.	9	6	0
Advertizing	1	1	9
Postage	2	9	1
Expenses at Annual Meeting	1	16	6
Gas Account	3	3	4
Printing	3	18	0
Gas Fittings	1	3	1
Painter's account	0	17	3
Taxes, including landlord's proportion	3	10	6
Delivering billets and attendance of Porter at Meetings	1	14	6
Stationery	0	5	6
	£52	16	8½
1856 Dec. 30. Balance due Secretary	£2	16	8½

	£	s.	d.
July. By Cash	50	0	0
Dec. 30. Balance due Secretary	2	16	8½
	£52	16	8½

Edinburgh, 16th April, 1857.

We, the undersigned, have examined the foregoing account with vouchers attached, find them correctly stated, and the balance due to the Secretary, as at 30th December, 1856, to be two pounds sixteen shillings and eightpence sterling.

H. C. Baildon,
Wm. Ainslie,
J. F. Macfarlan.

The Council beg particularly to express their sympathy with the President, Mr. Robertson, who for a period of nearly three months has been confined to the house with severe and painful illness. While they are glad to know that he is now convalescent and rapidly recovering, and while they further sincerely hope that restoration may be speedy and complete, they cannot but regret that, in consequence of this affliction, his valuable asistance has been unavoidably lost to the Society for so long a period.

The Council have great pleasure in testifying the high sense they entertain of the value of the labours of the Secretary, Mr. Mackay. To his unwearied and zealous exertions it is mainly owing that the Society has been able to maintain its efficiency, and to a continuance of his valuable services they look for an increase of its prosperity.

The Council, in conclusion, are sorry that they are not in a position to make further remark regarding progress in obtaining a National Pharmacopœia. Every day continues to render more and more manifest the desirableness of such a publication, and believing as they do that this work would be hailed as a great boon by Medical Practitioners and Pharmaceutical Chemists, they are quite certain every assistance will be readily afforded by the Society, if considered requisite, in co-operating to complete so valuable a production as a Pharmacopœia, emanating from the united Colleges of England, Scotland, and Ireland.

Mr. Currie (of Glasgow) moved the adoption of the report, which was carried *nem. con.*

Mr. Macfarlan moved that Mr. Flockhart be elected President, and Mr. Brown of Dunfermline, Vice-President for the ensuing year—carried unanimously.

Mr. Aitkin proposed as Members of Council, the President and Vice-President, Messrs. Ainslie, G. Blanchard, Robertson, Young, Tait, Steele, Lindsay, Gardner, Macfarlan, Dron of Kirkcaldy, Mr. Hart of Glasgow, and Mr. Mackay—carried *nem. con.*

The following were also nominated as Examiners: the President and Vice-President, Messrs. Robertson, Baildon, Gardner, Tait, Macfarlan, Mackay, the President and Vice-President of the Society in London *ex officio*.

The Chairman moved that Mr. Macfarlan be nominated as the representative Member of Council in London.

Mr. Brown moved as the Directors of the Museum, Messrs. Ainslie, Young, W. Baildon, and W. Macfarlan—carried.

Mr. Baildon moved, and Mr. Macfarlan seconded the re-election of Mr. Mackay as Secretary—carried by acclamation.

Mr. BROWN having alluded to a recent communication of the Highland Society on the subject of the analysis of guano,

Mr. MACKAY explained that, in the course of a correspondence between an eminent Chemist in the west country, Mr. Hall Maxwell, and Professors Christison and Wilson, Mr. Maxwell had inquired whether there were any Chemists throughout the country who were capable of analyzing guano. A doubt having been expressed on the subject, application was made to the Council of that Society, who had issued a circular with a view of ascertaining to what extent the Members would be able and disposed to afford the assistance desired. Only a few replies had as yet been received, but the result would be duly announced as soon as the answers from the other parties had come to hand.

A vote of thanks to the Chairman terminated the proceedings.

THE ANNUAL DINNER

was held in Young's New Royal Hotel, Princes Street, at half-past five on the same evening. Mr. FLOCKHART, President of the Society, was Chairman; and Mr. BROWN, of Dunfermline, Croupier.

After the usual loyal toasts, Mr. BROWN proposed "The Pharmaceutical Society." He alluded to the origin of the Society, with comparatively few but large-hearted and far-seeing supporters, who, by their assiduity and perseverance, had surmounted the discouragement which beset them, and had thus obtained, first a Charter, then an Act of Parliament. The latter, he said, was but a loose robe, thrown round the Society by way of distinction. They were only beginning to bud, but in course of time would blossom and bear fruit. Already the Society had done much in raising the tone of Pharmaceutical education, and improving the standard of medicinal preparations. There were still some difficulties to be encountered, but by perseverance they would surmount them, and extend the influence of the Society throughout the kingdom. He concluded by some practical remarks on professional education as the groundwork of the prosperity of the Society and the credit of its Members.

Mr. CURRIE, of Glasgow, proposed "The Board of Examiners and Council in Edinburgh," with some appropriate comments on the functions of the Board, and the stimulus of the examinations in promoting industry and improved qualification.

Mr. MACFARLAN proposed "The University of Edinburgh," which, he said, although comparatively young, had outstripped the sister universities of Oxford and Cambridge. In every quarter of the globe some of the alumni of the University of Edinburgh were to be found filling places of distinction, and reflecting credit on the source of their education. Passing from such names as Cullen and Black, and others who were gone, he might refer to the Honorary Members of the Society, who were elected on account of their distinguished merit, and for whose services they had reason to be grateful. Mr. Macfarlan concluded by some effective allusions to the great strides the University and its professors had made in education, and in all that relates to the scientific, moral, and intellectual development of the mental faculties.

Mr. YOUNG proposed "The Colleges of Physicians and Surgeons," and Mr. D. R. BROWN proposed "Pharmaceutical Education."

Among the other toasts were "The Honorary Members," "The Retiring President, Mr. Robertson," "The President and Council in London," "Dr. S. Macadam," "The Chairman," "The Croupier," "The Secretary."

Want of space obliges us to condense this report, which arrived rather late.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 26th March, 1857.

MR. ABRAHAM, THE PRESIDENT, IN THE CHAIR.

THE Secretary, Mr. MERCER, announced donations to the library of the *Report of the Society of Arts* from Dr. Hume, and twelve volumes from himself. The following paper was then read by GEORGE HAMILTON, Esq., F.C.S., F.R.A.S.,

ON THE CONSERVATION OF FORCE.

It must be extremely gratifying to all Chemists to observe that our distinguished countryman, Professor Faraday, has turned his attention to the subject of the conservation of force. So acute and able a philosopher cannot fail to leave behind him some new light to guide those who follow in the same path of investigation.

The lecture lately delivered by Professor Faraday has been so reported in the public journals as to represent the doctrine of the conservation of force as the result of the professor's own most recent researches, and now for the first time publicly announced; and further, that it subverts the Newtonian law of gravitation, and establishes a new theory of the universe. I have so strong a faith, not only in the ability, but in the philosophic cautiousness and integrity of the learned professor, that I at once reject the report as inaccurate, and proceed to make a few observations.

The subject was first brought before the British public by Grove, in a lecture delivered at the London Institution in 1842, and more fully expounded in a course of lectures in 1843. These lectures were afterwards remodelled, and published in the form of an essay, under the title of *The Correlation of Physical Forces.* On page 16 of that essay the author states that it is an irresistible inference from observed phenomena that a force cannot originate otherwise than by devolution from some pre-existing force or forces; and on page 4 he says, "The extent of claim which my views on this subject may have to originality must be left to the judgment of the reader: they became strongly impressed upon my mind at a period when I was much engaged in experimental research, and were, as I then believed, and still believe, *new.*"

The labours of Joule, and the profound investigations of Thomson, on the subject of heat must be regarded as part, and a very important part, of the history of this comparatively new doctrine, since they aim at assigning to the forces on which they treat quantitative relations, without which no accuracy can be attained in any branch of physical inquiry.

A force may be defined to be that which moves or tends to move a body, or which stops or tends to stop the motion of a body. If a body, A, moving along a plane, strike another body, B, there are two things connected with the phenomenon which our faculties are fitted to observe and reason upon—matter and motion; or, if we proceed with the analysis to its utmost limit, we may resolve the idea of motion into the ideas of matter, time, and space. We have no idea of a separate and distinct thing—force. If A moves with greater speed it strikes B with greater force; that means, that, after impact, it is observed, in the same given time, to move over a greater space than in the previous experiment.

The term "motion" involves the idea of body, time, and space, and expresses a certain qualitative relation between them. The term "force" embraces the same three ideas, and expresses a certain quantitative relation between them. If, then, we know nothing of force in the abstract, it is evident that we can know nothing of distinct species of force. The terms "electrical force," "magnetic force," "affinity," are convenient to indicate loosely classes of conditions under which the movements of matter take place. Let any one try to point out the essential distinction between any two of them, and he will find that he is grappling for a metaphysical *entity,* or rather nonentity, which always eludes his grasp. When we can fairly divest ourselves of the encumbrance of metaphysical subtleties, and address ourselves to the observation and classification of phenomena, we shall then, and not until then, be prepared to comprehend what is meant by the conservation of force, or, as it may be otherwise expressed, the indefinite propagation of motion.

If motion be taken in connexion with the so-called imponderable agents or forces—heat, light, electricity, magnetism, chemical affinity—it will be found that, by taking any one as the initial agent, all the others may be produced.

1. Motion.—A hammer moves against a piece of lead; *heat* is given out, which ignites phosphorus; *light* is emitted; *affinity* is brought into action between the burning body and the oxygen of the surrounding air; but further, the same heat acts on the thermo-electric battery, and a current of *electricity* passes through the conducting wires, and produces *magnetic* phenomena in the thermo-electric multiplier.

2. Heat.—Heat expands a body, or causes *motion* among the particles. It acts on the thermo-electric pile, and the rest of the series follow as before.

3. Light.—Light causes chlorine and hydrogen to combine—*motion* and *chemical*

affinity. It acts on a daguerreotype plate, which may be so arranged that the chemical action at the surface will produce a current of galvanic electricity through attached wires; and if the terminals be connected with a delicate multiplier, deflection of the needle—that is, *motion*—will ensue.

4. ELECTRICITY.—Electricity produces *motion* in bodies, *heat* and *light* in the spark. It acts chemically in decomposing water and causing oxygen and hydrogen to combine. When a current is sent through a coil, it converts a piece of steel placed within into a *magnet.*

5. MAGNETISM.—Magnetism can be employed to produce currents of *electricity. Motion,* heat, &c., follow.

6. *Chemical action* in the cells of a battery produces *electric* currents, from which, as before, all the other forces may be derived.

There is, therefore, a *correlation of the physical forces.*

Now, it is evident that, in the case of striking a piece of lead with a hammer, motion is propagated in the expansion of surrounding objects by the heat evolved. We can assign no limit to its continuance. It may be said that the heat is ultimately dissipated and lost, which may serve very well for ordinary purposes; but we mean only that we cannot trace the effects beyond a certain point. Strictly speaking, a motion once commenced can never end.

There is, therefore, a *conservation* of force, or an indefinite propagation of motion. But how shall we speculate on the chronological order of these forces from the beginning, or trace any given effect back to its absolute first cause? Corn is ground by a mill worked by the force of a stream, which stream is simply water flowing back to the level from which it was raised by the heat of the sun. Many of the forces of nature may be traced to the same cause.

The law of intensity, as affected by distance, does not depend on the nature of the force. It is of no consequence, for instance, whether light is caused by the projection, in straight lines, of luminiferous particles, from the luminous body, towards all points of space, or by the alternate contractions and expansions of contiguous elastic sphericles in a *plenum,* or by undulations of an ether. If it act from a centre, its intensity at any given distance will be diminished in proportion to the increased area over which it is spread, and the most elementary geometry shows that to be as the squares of the distance. It is neither wonderful, therefore, nor doubtful, that at half the distance the force should be four times as great. That is a necessary consequence of its emanating from a centre, and this law of the inverse square of distance is in no way inconsistent with the doctrine of the conservation of force. But science has a difficult task to accomplish in tracing out and assigning the quantitative relations which subsist among these various classes of correlated phenomena. To determine, for instance, the quantity of heat evolved by the impact of given masses moving with given velocities, and the electrical, chemical, and other effects, which may be regarded as functions of that quantity. There is no way of accomplishing this task but by going back to the conditions under which mass, velocity, and force can be quantitatively estimated, and rising by means of a suitable analysis to cases which are more special and complex. Whether chemical phenomena will ever yield to such an analysis, it would be vain to conjecture; but of this we are sure, that by no other means can purely empirical generalisations be raised to the rank of *positive* laws.

A long and interesting discussion followed, in which several of the members present joined, and the thanks of the meeting were accorded to Mr. Hamilton for his valuable and interesting communication.

Mr. MERCER then made some observations on preserved meat juice and pepsine, preparations which have been lately brought into use, and specimens of which he placed on the table.

Mr. SAMUEL exhibited a specimen of crystallized bihydrated sulphuric acid.

Thursday, 9th April, 1857.

ROBERT CLAY, ESQ., IN THE CHAIR.

Mr. Martin, Brownlow Hill, was elected a Member of the Society.

The Secretary, Mr. MERCER, announced that the competition amongst the students of the laboratory class had taken place for the President's prize, and that

Dr. Edwards had awarded the prize to Mr. J. W. Taylor; and he also reported that all the competing Essays were superior to any he had before received.

Mr. H. Sugden Evans, F.C.S., then read a paper on

MICROSCOPICAL EXAMINATION OF CINCHONA BARKS, ILLUSTRATED BY THE AID OF THE OXYHYDROGEN LIGHT APPLIED TO AN ORDINARY MICROSCOPE,

of which the following is an abstract:—

Having on a former occasion intimated his intention of making a microscopical examination of Cinchona Barks, from which he anticipated a ready means of estimating their commercial value, the paper this evening was to lay before the Society the results of a preliminary examination.

Although from the repeated examination of a great number of specimens he had hitherto failed in discovering differences of structure, sufficiently distinct and decided, to be relied upon as positive indications of species or quality, there were, he said, certain broad and general distinctions of structure sufficient to indicate, to some extent, the character of the bark.

The more specific differences appeared to be obliterated during the growth of the elementary tissues, which, being subjected to such varying influences of climate, temperature, and situation, frequently become entirely changed in their characters, and this might often be seen in sections taken from different positions in the same bark.

These circumstances greatly complicated the study, adding to its interest as well as to the difficulty of reducing its results to general and practical utility. In demonstrating the differences which could readily be traced, Mr. Evans wished to impress on the Society the vast field which lay before them in utilizing the immense power of observation afforded by the microscope, and hoped to enlist some in the service. With a greater number of earnest, patient observers, he considered it would not be long before the microscope would be made to speak out with a clear and decided voice, not only with regard to the secrets of each kind of Cinchona bark, but of the quality and purity of nearly every substance the Pharmaceutist has professionally to deal with. Hitherto there has been a lack of earnestness in observers, and in this respect our continental and even transatlantic brethren have outshone us; but surely the British Pharmaceutist will not longer suffer it to be said he is one whit behind his neighbours.

Mr. Evans concluded by illustrating the structure of the principal varieties of Cinchona bark, by a novel and very successful application of the oxy-hydrogen light to an ordinary microscope, the magnified image of delicate sections of the barks being very clearly and brilliantly delineated upon a disc, the magnifying power employed being an ordinary achromatic objective of half-inch focus.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE MANUFACTURE OF THE CHINESE GREEN DYE, CALLED 綠膠 *LO-KAO.*

BY THE REV. M. HÉLOT,

Missionary of the Company of Jesus.

(*Continued from page* 520.)

Manufacture of the Lo-kao at Azé.—In the account which we have previously given of the dyeing of cotton cloth by the bark of the *Lo-za*, it will have been observed, that the cloth after each immersion in the dye, is placed to dry and exposed to the sun, *without having been rinsed in pure water*. Now it is from the *excess of dye* in this cloth that the substance *Lo-kao* is extracted.

The process is as follows: five or six vessels filled with clear cold water are prepared. Into the first vessel the dyed cotton cloth is immersed and shaken

about (without precisely being washed); the water becomes slightly coloured green. The same process is repeated in the second vessel, in the third, in the fourth, and so on; the cloth being lastly dried, is ready for sale. The water from the several vessels is collected into a large boiler; on the surface is spread a somewhat thick layer of cotton threads, and the whole is then heated. Upon boiling, the colouring matter suspended in the water, but not dissolved, is entangled by the cotton threads, and subsides, while the water itself becomes transparent: this water is then poured off and the cotton threads subjected to the same operation a second time, and so on until they are sufficiently loaded with the green colour. In general, about six pounds of cotton thread are required for absorbing the excess of green colouring matter set free in the washing of 300 pieces of cloth, each thirty feet long by one foot broad.*

The cotton threads being properly charged with colour, are washed, being rubbed in the hands, six pounds requiring about 100 pounds of clear cold water. An impalpable green powder is separated and settles to the bottom of the vessel. The cotton threads are washed in this way in eight or ten waters, when they are put aside to be again charged. The green powder collected in the several vessels having been united and thoroughly washed by decantation, is rapidly dried in the following manner: a sheet of bibulous paper having been placed upon a layer of ashes, the colour in the condition of a thin paste is poured on to it, and carefully and gently spread out; the ashes absorb the moisture, and the sheet is soon ready to be removed and dried in the sun. The thin layer of colour cracks, and separates from the paper in the form of little flakes, which are disposed of in trade under the name of *Lo-kao*. The thinner the flake, the more it reflects,—still more so if it is dried on a polished surface; so in fact, this *reflet* must be cautiously accepted as an indication of the goodness of the dye. Forty pieces of cloth afford about one ounce of *Lo-kao*. One of the manufactories at Azé dyed during this year 8000 pieces, and sold upwards of 12 lbs. of *Lo-kao*. The five factories at Azé could hardly produce altogether more than 30 lbs. or 40 lbs. of the dye. The manufacturers of the dye sell it only in packets of ten ounces, the average price being weight for weight, about the same as silver, say eight or nine francs per ounce; but the demand which Europeans have of late made for it, has caused an advance, and when I was at Azé, the price had risen three dollars per 10 ozs., being, in fact, fifteen dollars instead of twelve.

I have made some minute inquiries as to adulteration, but all the workmen whom I have asked myself, and still better those whom I have caused to be interrogated by a skilful Chinese, have alleged that the thing could not be done, and that any foreign substance, even in small proportion, would vitiate the colour too much for it to pass undetected. The only addition that I can discover is ever made, are fine iron filings, which give weight without impairing colour: but they are easily perceived upon wetting a little of the dye and rubbing it on a glass with the finger-nail. The dye may lose, however, much of its beauty, if not carefully preserved from damp. For this reason it ought to be wrapped in a piece of skin and kept in a vessel containing fragments of quick-lime, which of course must be renewed as they become hydrated. The readiness with which the *Lo-kao* changes by moisture, explains why it can only be prepared in winter, since in spring and summer the solutions would speedily become mouldy, and the colour would be lost.

The manufacture carried on at Azé is confined to the dyeing of cotton cloth with solutions of the bark of the *Lo-za*, and to the extraction of the green dye *Lo-kao*, the latter being all sold. I have been told, however, of three houses at Soo-chow who make use of *Lo-kao*, and have obtained the following particulars regarding its employment from a workman who has been engaged in dyeing with it.

To form the dyeing solution, the requisite quantity of *Lo-kao* is placed in a

* This *foot* is about equal to the *metrical foot* or 0.33 metre.

little cotton bag: the proportion of one ounce of the dye for every ten pieces of cloth (each 30 feet by one foot) dyes a strong colour; the same quantity used for 25 or 30 pieces of cloth imparts a lighter colour, such as that of the specimen I have sent. At all times, it is desirable to prepare no larger quantity than is likely to be used at once. The *Lo-kao*, being tied up in a little bag, is softened and reduced to a pulpy condition by being allowed to soak for twelve hours in water. Some more water is then added, and the bag is squeezed and rubbed in the hands until the *Lo-kao* is well diffused through the water. Carbonate of soda is then added, in the proportion of ten ounces to one of the dye: the liquor is then heated until perfect solution takes place. The quantity of water is arbitrary, depending on the intensity of tint required. The bath being in readiness and heated to from 50° to 60° [122° to 140° F.], the cloth to be dyed is immersed in it. Such cloth ought to be perfectly white and deprived of its stiffening by washing.

The liquor is wrung out by twisting, and the cloth, without being dried, is dipped a second time, and again wrung out: it is afterwards rinsed in clean water, and dried in the shade. Such cloth is known in Chinese commerce by the name *Ou-lo-sé*, *i.e.* water-lily green colour, or *Ou-lo-pou*, *i.e.* cloth of the colour of the leaf of the *nenuphar*. A piece of cloth 30 feet by 1 foot is reckoned to cost for dyeing 15 cents, which for a square *metre* would be a little over 5 cents.

The conclusions I have arrived at may be thus summed up:—

1. The shrub affording the dye *Lo-kao* is of two species, both growing wild—the one on the mountains in the S.W. of Tche-kiang, the other in the fertile plains of the same province.

2. It is by the maceration of the bark of these shrubs, assisted by the action of the sun, that the green colour is extracted. It is not prepared from the seed, which is however a little black berry like the *cassis*, which, crushed upon white paper, stains it green. No use is made of this berry at Azé.

3. Cloth coloured green by the liquor obtained direct from the bark of the *Lo-za*, ought to be regarded not as dyed with the *Lo-kao*, but rather as a residue obtained in the preparation of this substance. This will explain how the colour of this expensive dye is imparted to so cheap a material. Silk is said to be never dyed with *Lo-kao*.

4. The only mordants used are lime, which is added in the maceration of the bark, and carbonate of soda, which is employed to render the *Lo-kao* soluble.

A peasant of Shantung has, however, assured me that alum is used in that province.

5. The quality of the dye depends on the fineness of its paste. The best *Lo-kao* is that obtained in dyeing cloth successively with the *Hom-bi* and the *Pa-bi Lo-za*, such as in the process carried on at Azé. I have been assured that it is also prepared from the bark of the *Pabi-Loza* only, but at Azé they consider such product inferior.

6. To preserve the dye, it must be kept secure from humidity and consequent mouldiness.

[*Note by the Translator.*—In the above communication, the French system of representing the sound of Chinese words has been followed; and as this may occasion perplexity to some readers, I avail myself of the kind assistance of a Chinese scholar to add for comparison a list of the principal words as spelt according to Dr. Morrison's manner:—

Hélot.	*Morrison.*
Lo-kao	Lŭh-kaou.
Lo-za	Luh-tsai.
Pa-bi	Pih-pi.
Hom-bi	Hung-pi.
Lieu-lo-chou	Lew-luh-shoo.

Hélot.	*Morrison.*
Lieu-lo-tche	Lew-luh-che.
Se-lo-pou	Se-luh-poo.
Ou-lo-pou	Ho-luh-poo.
Ou-lo-sé	Ho-luh-tsai.
Azé	?

SIAM CARDAMOMS.

Among some recent imports from Bangkok, the capital of Siam, are 66 bags of Cardamoms, which have been offered for sale in London. The principal portion of these Cardamoms, namely 43 bags, are the fruits, not of *Elettaria Cardamomum* Maton, but of *Amomum Cardamomum* L., a drug once well known in Europe, but for many years past of very rare occurrence. This Cardamom, described by Pereira as the *Round* or *Cluster Cardamom*, and also known as *Amomum verum*, *Amome en grappe*, &c., possesses a very agreeable and powerful aromatic, camphoraceous odour and taste, closely analogous to those of the Malabar Cardamom (*Elettaria Cardamomum* Maton), which it would well replace in medicine.

The remaining bags consisted of the seeds of *Amomum xanthioides* Wallich, deprived for the most part of their capsules, of which, however, quite sufficient remained for the ready identification of the species. The seeds are mostly coherent in three-lobed masses; they are tolerably aromatic, with a somewhat peculiar flavour.

Amomum xanthioides was discovered in Tavoy by Gomez, Dr. Wallich's botanical collector, in the year 1827, but the specimens he obtained were without flowers, and therefore not complete enough for a full botanical description. The plant was, however, named and included in the catalogue of the Indian Herbarium presented by the Hon. East India Company to the Linnean Society of London. In the *Pharmaceutical Journal* for March, 1855, may be found a figure of one of Dr. Wallich's specimens, and also Dr. W.'s brief memoranda on the plant, taken from his own MSS.; this we believe to be the only description of *Amomum xanthioides* yet published.*

GENUINE BREAD WITHOUT ALUM.

In accordance with invitations from the proprietor of the Polytechnic Institution to a meeting of medical and other scientific men to witness the application of a new process for fermenting and making bread without the use of alum, &c., about twenty or thirty gentlemen assembled in the lecture-room at or near the hour appointed. There was an array of specimens of bread and of ingredients used or said to be used in its manufacture and adulteration. After waiting about half an hour for the company to assemble, Mr. Pepper delivered a lecture on the process of bread-making, in which he explained Mr. Stevens's new process of fermenting bread. He described the usual mode of making bread, as adopted by London bakers, which, he said, consisted in boiling some potatoes, mashing them into a softish paste with water, mixing this with yeast, allowing the mixture to ferment, then mixing it with a portion of the flour and fermenting it, to form what is called the "sponge," breaking the sponge by the addition of a considerable quantity of water, and adding the remainder of the flour, together with some common salt, and usually a little alum, to form the dough, which is divided into loaves and put into the oven.

In Mr. Stevens's process no potatoes are used. He employs the yeast obtained from pale ale breweries, and this yeast is washed with water to deprive it of bitter taste. The yeast is mixed with a little flour and water and left to ferment, after which more flour is added to form the sponge, and the remainder

* It has also appeared in the *Journal de Pharmacie* for 1855, and in *Bonplandia*, iii., p. 129, in both cases extracted from this Journal.

of the process is the same as that above described, excepting that Mr. Stevens adds no alum, that he uses a smaller quantity of yeast than is usually employed, and that his bread is made into long rolls like the French bread, instead of cubical loaves such as English bakers usually make.

Mr. Stevens's process is essentially the same as that adopted by private families in making "home made bread." Mr. Stevens states that perfectly good and light bread may be obtained by his process, if the best wheaten flour be used, without the necessity of adding either potatoes or alum, but in consideration of the great purity of his bread, he charges a penny a loaf more than the usual baker's price. If there were no other question involved than the means of making good bread from the best wheaten flour, irrespective of price, Mr. Stevens's solution of the question might be admitted to be complete, and yet he could not correctly claim credit for the discovery of anything new. But the bakers' question involves the means of making bread of a good, and as far as possible, uniform description, from flour which is constantly varying in quality. The bakers are required to convert the corn of the country, such as is furnished by nature and husbandry, into the best bread it is capable of producing, and of supplying this bread to a dense and hungry population at the lowest price at which it can be made.

Experience has shown that, by the addition of a small quantity of alum a saleable and, to all appearance, a sound wholesome bread may be made with flour of inferior quality, such as would otherwise be scarcely fit for use in the form of bread. The use of alum being objected to, and in fact, contrary to law, the problem to be solved is, whether any less objectionable substance, or any variation in the process would answer the same purpose. Towards the solution of this question Mr. Stevens has done nothing, but his display at the Polytechnic Institution was rather a commercial exhibition than a scientific novelty. Samples of his bread have been extensively circulated among scientific and medical men, three twopenny (or threepenny?) loaves being sent in a basket with a note, requesting the favour of a trial and opinion, and a small pamphlet, entitled *A Digest on the Manufacture of Pure Bread.* Those gentlemen who have the courtesy to acknowledge this kind present, find their letters published as testimonials in favour of the bread.

DETECTION OF ALUM IN BREAD.

Two methods have been suggested for the detection of alum in bread:—

1. *The process of Robine and Parisot*, which consists in macerating the bread in cold water, filtering the liquid, evaporating to dryness, treating the residue with water, and testing the filtered solution for alumina and for sulphuric acid.

2. *The process of Kuhlmann*, which consists in incinerating the bread, treating the ash with nitric acid, evaporating to dryness, dissolving the residue in water, and testing the filtered solution for alumina.

The above represent, in their principal features, the two modes of proceeding, one or other of which is usually adopted by Chemists in this investigation.

In a paper recently read at a meeting of the Chemical Society, by Mr. E. H. Hadow, of King's College, London, the author gives the results of experiments which were made with the view of ascertaining which of the two processes above described was the best. Bread was made from pure flour, and a quantity of alum equal to that used by bakers was added to it. It was found that none of the alumina could be extracted by the process of Robine and Parisot, the water taking only the sulphate of potash and sulphuric acid of the alum. By Kuhlmann's process the alumina was readily obtained. The author, concluding from these results that the alumina had associated itself with some constituent of the bread, as it does under other circumstances when used as a mordant for fixing colours, thought its presence might possibly be detected by adding a colouring matter to the bread, and observing how far this was absorbed

and retained. A weak decoction of logwood was prepared, into which two pieces of bread, one of which had been made with alum, and the other without it, were put. The alumed bread acquired a decided purple dye, which penetrated to some depth into the interior, while no such result occurred with the bread to which no alum had been added. The author thinks this method may be made available for ascertaining whether alum has been used in making bread.

The results obtained by Mr. Hadow, in reference to Robine and Parisot's process, are confirmatory of those previously arrived at by other Chemists, and the other experiments, described above, also tend to confirm the opinion which has been expressed in this Journal and elsewhere, that when alum is used, as bakers usually employ it in the manufacture of bread, it undergoes decomposition and ceases to exist as alum in the bread.

ALUM IN BREAD.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—I notice in the periodicals a report of a recent meeting of the Chemical Society of London, at which Mr. E. A. Hadow read a paper upon the above subject.

He is stated to have taken exception to maceration processes, and to have recommended the incineration plan of Kuhlmann as perfectly satisfactory. Upon the first proposition I can fully endorse his opinion, and may add that some time since I put the question to the following proof:—Taking a sample of pure flour, I added to it alum in the ratio in which I found that substance in a sample upon which a miller had just been convicted, and I then saw the mixture made into bread. The maceration process extracted no alumina whatever from the bread, but by incineration the whole was recovered. Mr. Redwood has already pointed out that the effective portion of the base must lose its soluble form, and the difference between the physiological effects of bread containing insoluble or excess of soluble alumina respectively, is worthy of the attention of those to whose province it belongs.

If the plan of aqueous maceration has the disadvantage of not detecting alum when it has really been introduced, Kuhlmann's method is open to a more dangerous objection, inasmuch as it may appear to prove adulteration where none exists. As an absolute test, it is based on the assumption that alumina is not normally present in wheaten flour. This is an error, and the knowledge of its having in one case caused the accusation of innocent individuals has induced me to refer to the subject. Some months since, the Board of Guardians of a neighbouring town referred samples of the flour supplied to an Analytical Chemist. The incineration process was adopted, and two samples from highly respectable firms reported to contain alum. The matter became public, and further analyses were demanded. Having been entrusted professionally with one set of samples, which were officially verified, whilst the others were forwarded to Dr. Letheby, the result of our independent examinations coincided in reporting that no alum was present, but that a considerable amount of alumina was detected. Experiments upon various descriptions of foreign wheat had shown me that in the Egyptian variety, extensively used of late, a very large quantity of alumina is present after grinding, being greater or less according to the efficiency of the cleansing process to which the grain is subjected. The method of harvesting, the plant being pulled up by the roots and the grain trodden out by cattle, sufficiently accounts for the large quantity of soil intermixed, and this sometimes amounts to 25 per cent. of the total weight. As the grain is usually perforated by insects, the cavities resulting, and also the natural superficial depressions, are quite certain to retain a portion of aluminous earth, after the washing which it usually undergoes.

Without sufficient proof, the possibility of the plant assimilating a portion of alumina must be considered an open question.

Believe me, yours truly,

Leeds, April 17, 1857. RICHARD REYNOLDS.

ON THE USE OF ALUM IN MAKING BREAD.

THE Board of Works of the Holborn district have recently published in the daily papers a document signed by their Medical Officer of Health, Dr. Gibbon, in which the public are cautioned against the use of bread containing alum, the injurious effects of such an article of diet being described in terms calculated to cause much alarm. Dr. Gibbon says:

"On analyzing numerous samples of bread purchased of different bakers in the district, I have generally found them more or less adulterated with alum; in other respects the article has proved good and wholesome. Notwithstanding that the law (37th George III., cap. 98, sec. 21) prohibits under a penalty the use of alum in the manufacture of bread, it is admitted, even by bakers themselves, to be so used under the name of "stuff." I am satisfied that this sophistication has been practised with the most innocent intentions. The bakers believe the portion of alum mixed with the bread to be quite harmless; to a certain extent it is a commercial fraud, though it is a great convenience in the manufacture, and improves the quality of the bread in certain respects which the public appear to value. If it be perfectly harmless I conceive we have no right whatever to interfere in the matter. However, it is my deliberate opinion that, although alum is not a poison, yet that its use in the manufacture of bread is injurious to health, and concurs indirectly with other things in increasing the mortality, especially of young children, the staple article of whose dietary is bread.

The more effectually to discountenance this practice, I will briefly detail some of the grounds whereon this opinion is founded.

The well-known medicinal effect of alum is to confine the bowels. It is also well known that small doses of alum repeated for a considerable time will produce at first costiveness, afterwards great irregularity of the bowels—that is to say, alternations of costiveness and looseness, and at length continued looseness with ulceration. The quantity of alum which I have generally met with in bread has been in the proportion of from half a drachm to a drachm in the 4lb. loaf; so that the man who consumes half a loaf a day swallows every 24 hours from 15 to 30 grains of alum. Now it is found that even twelve grains per diem, taken by a healthy adult, will produce constipation. Its effects on children would, of course, be greater than on adults; a smaller quantity would suffice to produce the diarrhœa and dysenteric symptoms, and they would appear sooner. Alum enters into chemical combination with the gluten of the flour, therefore I admit that its effects in bread are less active and injurious than when administered in its pure state. I have little hesitation, however, in assigning this impurity in the bread as the chief cause of the frequent constipation, headaches, liver derangements, &c., of those who are dependent on bakers for their bread. The fatal diarrhœa of infants under three years of age may also have arisen from, or have been aggravated by, this cause.

As this adulteration has been practised for a very great length of time, I cannot recommend the adoption of any harsh measures for its suppression. I would suggest that all bakers in the district should be cautioned against it. If any flagrant case occurs where the injury to health is clearly made out, I shall feel it to be my duty to advise your board to take the necessary proceedings to prevent its recurrence.

When the bakers are duly informed of this opinion, I am in hopes that they will of their own accord cease to use alum in making bread. The bakers' plea at present is that it is harmless, that the "public like it," and "will have it." So that the more effectually to put down an adulteration which is injurious to health, the public on their part should cease to set so high a value on those qualities in a loaf which alum is used to produce.

The following particulars will, I trust, enable the purchaser to distinguish a loaf that does not contain alum from one which does:—

Alum increases the whiteness and firmness of the bread made from inferior flour, and thereby causes it to resemble bread made from the very best flour. The qualities which alum imparts to a loaf are very unimportant, having reference merely to the appearance, lightness, neatness of shape, &c.

The chemical action of alum on moistened flour is analogous to tanning, and destroys in a considerable degree its nutritiveness. It converts the gluten (the most nutritious portion) of the flour into a kind of tough, tenacious "wash-leather," which is difficult of digestion. This gives the dough a tenacity and firmness, enabling it to retain the thousand of little air bubbles (given off by the yeast) which constitutes the "lightness" or spongy porous character of the bread. Hence flour that will not "rise" may be made to do so by means of alum. Another object in the use of alum is, that it preserves the upright form of the loaves, and prevents them from adhering firmly together, thereby enabling the baker to separate them more readily on their removal from the oven—the "batch parts clean," as the expression is, without tearing. An unalumed loaf is, with a little practice, distinguishable from an alumed one by its appearance alone: it is wanting in all those peculiarities which I have mentioned as the effects of alum; it is not so bulky, nor so symmetrical in its shape; its sides are roughened and torn, in being separated from the batch. Unalumed bread "bites short," alumed bread "bites tough," and the rough, sour taste of alum is slightly perceptible in it. The most marked contrast, however, is apparent in "crumbling," when a day or two old. Unalumed bread crumbles with the greatest facility by rubbing it between the hands, whereas alumed bread, however old, "crumbles" with difficulty. In the same way alum renders the new loaf less liable to crumble when cut."

There is a strange mixture of truth and error in this document, to which it seems desirable to direct attention. We do not propose here to discuss the question, whether or not the use of alum in making bread is free from objection, but wish to point out some of the fallacies upon which the current opinion on the subject is founded. Dr. Gibbon having discovered, in the 2 lb. loaf of bakers' bread, a quantity of alumina and sulphuric acid equivalent to from 15 to 30 grains of alum, proceeds to point out what would be the effect of taking this quantity of alum daily, and concludes that alumed bread must be highly injurious to the health of those who eat it. By a parity of reasoning, it might be concluded that the common salt contained in the bread, and used with almost every article of diet, must be highly injurious, because the chlorine or sodium in a separate state would be so. Dr. Gibbon, indeed, seems to have been aware that his argument involved a fallacy, for he admits that the alum enters into chemical combination with the gluten of the flour, and therefore that its effects in bread are less active and injurious than when administered in a pure state. Had he carried his chemistry a little further, he would have found that the alumina, and not the alum, combined with the gluten; and then, if he could have shown that the 3 grains of alumina contained in 30 grains of alum (the maximum quantity in the maximum consumption of bread for a grown person) would cause injury to health, he might with better reason, but still without sufficient warrant, have inferred that alumed bread was injurious to health. But his chemistry having failed him, and his first argument having broken down, he resorts to a second,—the alum converts the gluten of the flour into a kind of tough, tenacious wash-leather, which is difficult of digestion. Here it may be asked, what evidence is there that alum makes the gluten difficult of digestion? The conclusion is arrived at, not as the result of observation, but of reasoning founded upon supposed analogy. Wash-leather is difficult of digestion; alumed gluten is a kind of wash-leather, therefore alumed gluten is difficult of digestion.

Such are the arguments adduced to show that the public health is injured by the use of alum in making bread. The subject has never been fully and fairly discussed on its true merits. Dr. Gibbon has, we believe, pretty correctly stated the advantages resulting from the use of a small quantity of alum, which, as he says, "improves the quality of the bread in certain respects, which the public

appear to value." This is the result of observation and practical trial. The use of alum gives tenacity and firmness to the gluten, "enabling it to retain the thousand of little air bubbles which constitutes the lightness or spongy porous character of the bread," qualities which Dr. Gibbon tries to persuade us are very unimportant, but which the public nevertheless "appear to value." While these advantages are generally admitted, the objections which are urged against the use of alum are altogether problematical, and unsupported by any satisfactory evidence. Although the evidence we possess will not justify the assertion that the use of alum in making bread is wholly free from objection, yet there are sufficient grounds for concluding that the evils which have been assigned to that practice have been greatly exaggerated; and as certain advantages appear to result from it, the subject ought to be thoroughly investigated by a competent scientific commission, appointed by the Government.

ON SOME POINTS IN THE COMPOSITION OF WHEAT-GRAIN, ITS PRODUCTS IN THE MILL, AND BREAD.

BY J. B. LAWES, F.R.S., F.C.S., AND J. H. GILBERT, PH.D., F.C.S.*

THIS paper discussed an extensive series of experiments, in which wheat-grain and its products were traced from the field to the bakery, the results being given in numerous tables. The first of these gave a summary of the results of the growth of wheat for ten years consecutively on the same land, and illustrated the influence of variation of climatic circumstance, from year to year, in one and the same locality, upon the general character and composition of the crop. The conclusion the authors arrived at, was, that within the limits of their own locality and climate, the season yielding the admittedly best character of grain, also generally afforded a high per-centage of dry substance in the grain, and comparatively low per-centages both of mineral matter and of nitrogen in that dry substance. The straw showed variations in these same points of composition, generally somewhat in the same direction as the grain, but subject to a wider range of exceptions than the latter in this respect.

The influence of various conditions of *manuring* upon the character and composition of the crop was next considered. With this view, the results obtained upon individual plots during the same ten years were now given, instead of the average from many plots in each year, as when the effects of season alone were to be discussed. In the experiments illustrating the effects of manures, there was pretty generally a slight increase in the per-centage of nitrogen in the grain grown by an annual excess of ammoniacal salts, compared with that grown by its side on land which was continuously unmanured. In the average of the seasons, however, there was a somewhat lower per-centage of nitrogen in the grain, where there had been a liberal supply of the required mineral constituents also, than where the ammoniacal salts were used alone. The range of difference in the per-centage of nitrogen, in the produce in one and the same season, was, however, even with these extreme variations as to the available supplies within the soil, not nearly so great as it was in different seasons with one and the same condition of manuring.

Twenty-three analyses of wheat-grain *ashes* were next recorded; nine referring to grains grown by different manures in 1844; eight to similarly varying specimens, the produce of 1845; and six to as many of 1846. From these it did not appear that the per-centage of any particular constituent of the ash of the ripened grain, was directly affected by the liberal use of it in manure. At any rate, the differences, if any, due to this cause, were within the limits of the ordinary errors of analysis. Here again, however, the effects of varying season were more marked than those of various manuring. Thus it was shown in a summary table of the results of the ash analyses, that the difference in the per-centage amount of almost every constituent, was much the greatest among the several grain ashes of 1845, which was a very bad ripening season, and much the least among those of 1846, which was the best maturing season of the three included in this comparison. It would thus appear that, other things being equal, the more favourably and perfectly matured the grain, the more constant would be the composition of the ash, and the less any direct

* *Quarterly Journal of the Chemical Society*, April, 1857. Read January 19th, 1857.

effect upon it, from the mineral supplies by manure. Taking together the mean of twenty-three analyses of the ashes of grains grown at Rothamsted, and that of twenty-six analyses of wheat-grain ashes published by Mr. Way, it appeared that this ash consisted essentially of phosphates of potash, magnesia, and lime. The phosphoric acid amounted to nearly 50 per cent., the potash to about 30, the magnesia to from 10 to 12, and the lime from $3\frac{1}{2}$ to 4 per cent. in the crude ash. The remainder, excluding adventitious sand and charcoal, consisted of small but variable amounts of soluble silica, peroxide of iron, and soda or chloride of sodium, with, according to Mr. Way, occasional traces of sulphuric and carbonic acids also. Soda or chloride of sodium seemed to abound much more in the ash of the less favourably ripened specimens ; and the results afforded no reason for supposing that soda could take the place of potash as a constituent of the ash of fully developed grain.

In selected cases, quantities of experimentally grown grains, namely, seven lots from the produce of 1846, nineteen from that of 1847, and two from that of 1848, were carefully watched through the milling process, In some of the cases nine, and in others seven different products of the dressing apparatus, were separately taken. The proportion of each of the several products in the respective grains was ascertained and recorded; and the per-centages of dry substance and mineral matter were also in every case determined. The three first wires of the dressing machine gave on the average rather more than 70 per cent. of the grain as *fine* flour, but in practice about 10 per cent. more would be obtained from the next two products, yielding in all 80 per cent. or more of pretty good bread flour. The average amount of *dry substance* in the various mill products was about 85 per cent., the external or more branny portions containing rather more, and the finer flours rather less. The per-centage of mineral matter varied very much in the different products, it being scarcely three-fourths of one per cent. in the fine flours, and ten times as much, or more than seven per cent. in the coarsest bran. From the much larger proportion of flour than bran, however, it resulted that rather more than one-third of the total mineral matter of the grain would be accumulated in its currently edible portions.

In one series of these mill products, from the finest flour at the head of the machine down to the coarsest bran, the nitrogen was determined, and also some of the constituents of the respective ashes. It appeared that the per-centage of nitrogen was about once and a half as great in the bran as in the finer flours. And even including all the currently edible portions, still the excluded branny parts contained considerably higher per-centages of nitrogen. Turning to the ashes of the respective mill-products, there was a much larger proportion of matter insoluble in acid in those of the finer flours than in those of the coarser brans ; of the *phosphoric acid*, on the other hand, there was considerably the higher per-centage in the ash of the brans. The magnesia also was the higher in the ash of the brans, and the potash and lime the higher in that of the flours. Looking to the *distribution* of the various constituents, according to the average proportion in the grain of each of the several mill-products, it appeared that about three-fourths of the total *nitrogen*, and about one-third or two-fifths of the total *mineral matter*, were accumulated in the usually edible flours; and of the total phosphoric acid there was only about one-third in the ashes of the latter. Notwithstanding the higher per-centage of nitrogen, and the large actual amounts of the mineral constituents of the grain contained in the branny portions, the authors were of opinion, that, besides the information at present at command as to the character and condition of the nitrogenous constituents of the bran, such were the effects of the branny particles themselves in increasing the peristaltic action, and thus clearing the alimentary canal more rapidly of its contents, that it was questionable whether frequently more nutriment would not be lost to the system by the admission into the food of the imperfectly divided branny particles, than would be gained by the introduction into the body coincidently with them of the larger amount of supposed nutritious matters. The action alluded to might indeed be conducive to health with those of a sluggish habit, or who were over-fed, but with those who were not so, the benefits derivable from an already perhaps scanty diet, would be still further reduced.

Experiments were also described in which several lots of the experimentally grown wheats were ground in a colonist's steel hand-mill. The results of the examination of the products thus obtained, were, in the main, consistent with those from the products of the ordinary mill. They showed, however, more strikingly, the effects

of mechanical means in separating different chemical compounds within the limits of the floury parts of the grain.

Experiments were next adduced, in which the different edible products, from grains grown by different manures or in different seasons, were made into bread; the several products of the dressing machine being employed sometimes separately and sometimes collectively. The result obtained was, that comparing with each other the three separate products which together yielded a fine flour, that at the head of the machine, which was the least nitrogenous, yielded on the average the least weight of bread for a given amount of flour—that is to say, it retained the least amount of water. Again, when the three products were mixed together, the flours of the season of 1846, which were the less nitrogenous, gave the less weight of bread—that is, retained less water than those of 1847, which were rather the more nitrogenous. The effect of an increase of nitrogen in augmenting the weight of bread was, however, not observable when this increase was due to including more of the more branny portions of the grain. The average yield of bread in twenty-two experiments with the individual products was rather more than 135 for every 100 of flour, equal to about 63 per cent. of dry substance and 37 of water in the bread. The average of nineteen experiments with fine flour, composed of the products of the first three wires mixed together, gave a produce of about 137½ of bread for every 100 of flour, and about 61½ of dry substance and 38½ of water in the bread. Bakers' loaves were next examined. Of these, four obtained from different bakers in the country, gave an average of about 62 per cent. of dry substance and 38 of water in the bread; and three, procured in London, rather more than 64 of dry matter and rather less than 36 of water. The authors concluded that from 36 to 38 per cent. of water was perhaps the best average that could be assumed for bakers' bread within twelve hours of its being withdrawn from the oven. They showed, by reference to a table of the results of other experimenters, that this agreed pretty well with the determinations of some of the most recent and trustworthy. Others, however, gave the water in bread as much higher; and all seem to agree that it was generally higher in country bread than in that of towns and cities.

The point next illustrated was the general influence of locality and varying climatic circumstance upon the per-centage of *gluten* in wheaten flour. It appeared by the numerous results adduced that, other things being equal, there was a tendency to an increase in the per-centage of gluten proceeding from the north to the south—a point which was illustrated in specimens both from the European and American continents. A comparatively high ripening temperature was, indeed, among other circumstances, favourable to a high per-centage of gluten. There were, however, interesting exceptions to this generalization; at any rate, so far as the per-centage of the *nitrogen*, if not of the gluten itself, was concerned. Direct determinations of nitrogen, in numerous pairs of specimens contrasted as to locality, had however led to conclusions perfectly consistent in the main with those to which the quoted results as to gluten had conducted; whilst the results of others pointed in the same direction.

The foreign wheats containing a high per-centage of gluten, which were generally ripened under a high temperature, had the undoubted character of yielding a flour of great "*strength*," and retaining a considerable amount of water in the bread. Owing, however, to their frequent hardness, and the peculiarity of their structural character generally, which rendered them both refractory in the mill and less fitted to make an easily workable dough, and a bread of the desired colour, texture, and lightness, they were less valued to use *alone* for bread-making purposes than many grains of less *per-centage* of gluten—provided only that they were in an equal condition as to maturation or elaboration of their constituents. Some of the most approved foreign bread-flour grains in the market had, indeed, a comparatively low per-centage of nitrogen; but apparently a very high *condition* of both their nitrogenous and non-nitrogenous compounds, as well as a very favourable relation to each other of these two classes of constituents. Within the limits of our own island again, on the average of seasons, the better elaborated grain would probably be the less nitrogenous; though the nitrogenous matter it did contain would be in a high condition as to elaboration, and as to its mutual relations, structural and chemical, with the other constituents of the flour. Hence it came to pass that, as our home-grown flours go, those which were the best in the view of the baker would frequently be those having a comparatively low *per-centage* of nitrogenous compounds—a higher

condition more than compensating for the higher per-centage of nitrogen, generally associated as it was in our climate with an inferior degree of development and maturation of the grain.

It was further maintained that the high per-centage of nitrogen or gluten in wheaten flour was no more an unconditional measure of value to the *consumer* than it was in the view of the baker.

In illustration of this latter point, a table was given, showing the relation of nitrogen to carbon in a number of current articles of food. It was submitted that the under-fed, or chiefly bread-fed working population would, as their means increased, generally first have recourse to the addition of bacon, or other highly fatty matters; which, though they might increase the actual amount of nitrogen consumed, would seldom increase, and frequently decrease, the *proportion* of the nitrogenous, or flesh-forming, to the more exclusively respiratory and fat-forming constituents. Indeed, so large was the amount of fat, and therefore of respirable hydrogen as well as respirable carbon, even in fresh meat itself, that by its use the proportion of the nitrogenous to the other constituents would be much less augmented than might be generally supposed. Further illustrating the point by reference to the average relation of nitrogen to carbon in numerous dietaries, in many of which meat was included, and therefore fat with its respirable hydrogen as well as respirable carbon, the authors concluded that, independently of cookery, that which was admitted to be a superior class of diet was distinguished much more by including a certain amount of the more peculiarly respiratory and fat-forming constituents, in the condition and state of concentration as in fatty matter itself, and of the nitrogenous ones in the high condition as in animal food, than by the higher proportion of the flesh-forming to the more exclusively respiratory and fat-forming constituents.

Finally, in an Appendix was given a tabular form, showing the relation of the yield, and composition of the bread, to that of the flour, according to the number of loaves obtained per sack (280 lbs.) of the latter. And, assuming it to be established that the loss of dry substance by fermentation was less than one, or perhaps less than half of one per cent. of that of the flour employed, it resulted that the gain in the weight of bread by the non-fermenting method, was simply a gain in the water retained. Unless, therefore, the unfermented bread were better adapted for digestion and assimilation, or it were sold at a correspondingly lower price, the consumer would be a considerable loser by the purchase of the unfermented loaf.

With a view to systematize and facilitate the further investigation of foreign wheats and their analogues, Mr. Lawes and Dr. Gilbert have suggested the following scheme for the collection of specimens of grain, &c., grown in different localities and climates.

Object.—To trace the influence of locality, and especially of varying climatic circumstances, upon the characteristic development, the structural and chemical composition (as shown by the microscope and chemical analysis), and also the coincident comparative practical qualities of *wheat-grain*, or the other cereals which (according to variation in locality and climatic circumstances), are grown in its stead, as staple food-produce.

With this view, specimens should be collected (each from three to four English pounds weight or more) of the well matured corn, as prepared for sale or use. For their safe preservation, they should, in hot climates, be well sun-dried, and in colder ones, dried artificially, at a temperature not exceeding 120° to 130° Fah. before being packed. Tin cases soldered down, or otherwise perfectly closed, would be the best means of preservation and transmission; or, in defect of these, small thick canvas bags; a number of these being afterwards packed into sound wooden chests or casks. Each specimen should be labelled to correspond with the number of a *Descriptive Form*, giving particulars of locality, climate, and other circumstances of growth, &c.

In the selection of specimens care should be taken to procure the characteristic cereal produce of each region, other descriptions as well as wheat; *wheat*, however, being taken as the typical produce or standard of comparison. And, the accompanying *Record* should state the reputed circumstances of soil, aspect, or climate, which are supposed to render the growth of one or another variety of the same kind of corn more appropriate than that of another, or of one or another crop more appropriate than that of wheat, wherever this latter (wheat) is to any material extent

substituted by other corn, such as rye, oats, &c., in the colder, or Indian corn or rice in the hotter regions.

It would be very desirable, wherever practicable, to provide with each specimen, or series of specimens, a registry in detail, of the particulars enumerated below. In case of the collection of an extended series, a book should be arranged, of which each page should constitute a *Form of Record* divided into two columns. The one headed *Particulars required*, and the other *Particulars recorded*. In the former the list of the enumerated items should be printed, and opposite to each (in the second column) any available information respecting it should be entered.

1. Names of country and locality.
2. Latitude and longitude.
3. General range of altitude above the sea (aspect, level, &c.); also general character of the soil.
4. Average dates of sowing and ripening.
5. Average annual, monthly, or other periodic rain-fall.
6. Average annual, monthly, or other periodic maximum, minimum, mean, and range of temperature.
7. Average annual, monthly, or other periodic barometric pressure, and dew-point.
8. Average number of weeks of active above-ground growth before blooming.
9. Climatic characteristics of period of growth before blooming.
10. Average number of weeks from blooming to ripening.
11. Climatic characteristics of period from blooming to ripening.
12. Where actual registries of rain, temperature, pressure, &c., are not available, state *in general terms*, especially for the above defined periods of growth, the characters as to *moisture of soil*, *moisture of atmosphere*, and *temperature of atmosphere*, of the locality yielding the specimen.
13. Whether chiefly grown for export, continuously, without manure, or in rotation, with manure, and what manure.
14. Supposed average produce to a given area of land; adopting the English acre and pound, or French hectare and kilogramme.
15. Whether generally a large or a small proportion of stem or straw.
16. In general terms, the estimation of comparative quality, and adaptation for bread-making, or other purposes.
17. Whether the specimen is an indigenous or imported variety, and how its characters are supposed to be modified by the climate, &c., under which it is grown.

REPORT OF THE

RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,

AND OF THE

APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D.

(*Continued from p.* 478.)

Preparation of Ferrum Reductum.—Hr. Zängerle* recommends igniting a mixture of 5 parts protoxalate of iron with 6 parts anhydrous ferrocyanide of potassium and $1\frac{3}{4}$ parts anhydrous carbonate of potash. The ignition is maintained until the evolution of gas from the melted mass ceases. This, when cold, is thoroughly washed with pure water and the residue dried. The product appears as a dark grey powder, consisting of metallic iron, so finely divided that when touched with a lighted match the whole mass burns gradually.

Preparation of Dye Pigment from Quercitron Bark.—Quercitron bark contains a considerable amount of tannin, which in the dyeing enters into combination with the mordants, and thereby injures the brightness of the colours. When the bark is treated with sulphuric acid the tannin is separated, and the colours then obtained are much brighter and richer.

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* *Neues Repertorium für Pharmacie*, vi., 27.

M. Rigaud's* observation that quercitrin is converted by the action of sulphuric acid into quercitin was first practically applied by M. Leeshing,† who subjected quercitron bark to the action of sulphuric acid.

Hr. Schäffer‡ recommends the following proportions:—

Quercitron bark	100 parts
Water	280 "
Sulphuric acid	26 "

The bark is to be boiled for two hours with the acid, then washed five or six times by decantation, and the residue pressed. This product, when dry, is equal to three times as much of the bark.

Hr. Schlumberger recommends:—

Quercitron bark	100 parts
Water	300 "
Sulphuric acid	15 "

He finds that the conversion of tannin into gallic acid requires a temperature of 212° F.; that neither lime nor potash is extracted from the bark by this treatment. When the product is mixed with cold water, and then with pernitrate of iron, the reaction of tannin is very slight, but an alcoholic decoction gives a precipitate with gelatine. He also finds that when quercitron bark, or the product obtained by the action of sulphuric acid upon the bark, is mixed with tannin, the colours obtained are somewhat darker, but more muddy; the addition of gelatine counteracts this effect completely. When gallic acid was added in the dyeing operation, the mordants were dissolved, as might have been expected, in accordance with the results obtained by Prof. Calvert.§ This fact shows further that the gallic acid produced by the action of sulphuric acid upon the tannin of the quercitron bark is removed by the washing, for otherwise the dyeing capability would be reduced instead of increased by this treatment.

By the treatment of quercitron bark with sulphuric acid the colour substance must have undergone a change, because the colour is fixed by mordants only at a high temperature, and is almost insoluble. An aqueous decoction deposits on cooling a copious yellow sediment, which appears to be Rigaud's quercitin.

Logwood, Lima wood, sandal wood, turmeric, Cuba wood, sumach, yellow berries, woad, galls, and pomegranate shells were subjected to the action of sulphuric acid in a similar manner, then washed, pressed, and dried. Hr. Schlumberger found that logwood, Lima wood, and sandal wood were injured by this treatment, but that the result was very advantageous with the other dye stuffs. The most striking effect was produced with sumach, when the water was mixed with 40 or 50 per cent. sulphuric acid by volume. The product, which may be called sumacin, thus obtained, gives finer yellow, grey, and black than quercitron, and the dyeing capability is increased fourfold; when mixed with garancin the colour obtained has more body, and the violet is not injured so much as is the case in dyeing with an admixture of wood containing tannin. Woad likewise acquires a much greater dyeing capability by the action of sulphuric acid, and the colour it gives is purer, but it requires then a temperature of 158° F. for dyeing.

Yellow berries, Cuba wood, and turmeric, treated in the same manner, give very satisfactory results in dyeing. For these substances, the liquid should contain from 15 to 20 per cent. concentrated sulphuric acid. The tannic acid of nutgalls and of pomegranate shells is not all converted into gallic acid by the action of sulphuric acid, but more colour substance is set at liberty. The colours produced with aluminous mordants are more decidedly yellow, and those produced with iron mordants are clearer. A stronger acid should be used for nutgalls than for pomegranate shells.

Chemical Relations of the Halogens.—The opinion that the chemical affinity of chlorine, bromine, iodine, and cyanogen varied constantly in degree, was shown to be incorrect under certain circumstances by Fehling, who found that in the fractional precipitation, by means of silver solution, of a liquid containing chlorine and bromine, the whole of the bromine is contained in the first portions of the precipitate.

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* *Ann. der Chem. u. Pharm.*, xc., 283.
† *Polytech. Journ.*, cxxxix., 131.
‡ *Bulletin de la Soc. Indus. de Mulhouse*, 1856, No. 136.
§ *Polytech. Journ.*, cxxxvi., 221.

M. Deville* has more recently brought forward a number of facts, which show that there are exceptions to this rule in the case of chlorine and iodine, as well as in the case of chlorine and fluorine. When silver is brought in contact with a mixture of hydrochloric and hydriodic acids, only iodide of silver is produced. Concentrated hydriodic acid acts violently upon chloride of silver, with evolution of heat; iodide of silver is produced, and hydrochloric acid gas evolved. An aqueous solution of iodide of potassium, digested with metallic silver, becomes alkaline, and iodide of silver is produced. Iodide of potassium is sensibly decomposed by fusion with silver.

Fluor spar is decomposed by gaseous hydrochloric acid at a high temperature. A mixture of fluor spar and alumina yields, by the action of hydrochloric acid gas, at the melting point of cast iron, chloride of calcium and fluoride of aluminum. Terfluoride of chromium may be obtained in a similar manner. Therefore hydrochloric acid gas decomposed fluorides of the alkaline metals, but not those whose formula is $R_2 Fl_3$.

Preparation of Caustic with Gutta Percha.—M. Robiquet† states that at the request of Dr. Maunoury, he has prepared caustic masses, by mixing together equal parts of gutta percha and melted hydrate of potash or chloride of zinc. These masses may be moulded into any required shape, so as to be applied to wounds, fistulas, &c.

Consumption of Soap.—Mr. Campbell states,‡ that in 1851 the average consumption of soap in Great Britain was 7 lb. for each person annually. This is a much smaller proportion than is consumed in some places; thus, for instance, in Jersey, the consumption is found to be at the rate of 13 lb. per head; in the Isle of Man, where the population is less wealthy than in Jersey, the individual consumption is 8¾ lb. In Jamaica it is 5 lb. The allowance to inmates of workhouses and prisons in this country is about 10 lb. per head yearly; and assuming this to be no more than necessary, it has been found that, after deducting from the quantity made, the quantity exported, and also the quantity consumed by manufacturers of woollen fabrics, &c., there remained only sufficient to supply 15,790,000 persons at this rate, and it may therefore be concluded that 5,000,000 persons in Great Britain were not in the habit of using this important necessary at all, or else that a larger number did so very sparingly. However, taking 7 lb. as the average consumption, this would give for London a total of 8705 tons annually. The corresponding quantity of soda would be 609 tons, and that of fat 5484 tons.

Preparation of Molybdic Acid from Molybdinum Glance.—Professor Wöhler§ states that the best way of preparing molybdic acid, is to heat lumps of the native sulphide of molybdinum in a glass tube, through which a current of air is passed. The molybdic acid sublimes quite pure.

Nuisances arising from Tallow and Soap-Works.—The question whether it is practicable to prevent the obnoxious smell produced in the melting of tallow and in soap-boiling, has recently been examined specially by Hrn. Grodhaus and Fink,‖ in consequence of complaints that have been urged against the proprietors of candle and soap-works in Hesse Darmstadt. Professor Stein, of Dresden, has made experiments on this subject,¶ and recommended the tallow to be covered with a layer of charcoal while melting. This plan was tried, but without satisfactory results. Hrn. Grodhaus and Fink recommend passing the vapour into the furnace a few inches above the bars, so that it may be burnt and carried away by the draught of the chimney; or passing it else into the chimney itself. For this purpose the melting vessel is to be covered with a closely fitting wooden lid, furnished with a tube, passing either into the furnace or the chimney. By this means it was found that with arrangements of apparatus, otherwise similar to what are generally employed in candle and soap-works, the offensive smell could be prevented, whether the fat was melted dry over the open fire, or by the aid of high pressure steam. An attempt was made to pass the vapour, when melting by steam, through the fire; but it was found to put out the fire, although this was not the case when the vapour was passed into the furnace over the burning fuel.

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* *Comptes Rendus*, xliii., 970.
† *Journal de Pharmacie.*
‡ *Engineer*, iii., 301.
§ *Ann. d. Chem. u. Pharm.*, c., 376.
‖ *Gewerbeblatt für das Grosshers.* Hessen, 1856. 337.
¶ *Polytechn. Journ.*, cxxxvi., 225.

Black Ink.—Hr. Reinige* mixes four ounces of concentrated decoction of logwood with 48 grains sulphate of iron; then adds successively 160 grains of crystallized carbonate of soda, 60 grains oxalic acid, and when the liquid has settled, 80 or 120 grains of gum.

Root of Chærophyllum Bulbosum.—M. Payen† has analyzed the root of this plant, cultivated by M. Jacques, head gardener at Neuilly. It contains:—

		Potato.
Water	63.618	74.00
Starch and similar substances	28.634	21.20
Cane sugar	1.200	—
Albumen and other nitrogenous substances	2.600	1.50
Fat	0.348	0.10
Ash	1.500	1.56
Cellulose (and pectose?)	1.478	1.64
Pectin	0.622	
	100.000	100.00

The starch granules of this root are globular; they are about one-third the size of wheat starch granules, and one-ninth the size of potato starch granules. Many of the granules present a flattened appearance at some part. The root of this plant seems to have acquired some importance in France as an article of food.

Preparation of Pyrogallic Acid.—Professor Liebig‡ recommends distilling well-dried gallic acid mixed with twice its weight of powdered pumice-stone in a sand-bath, and passing through the retort a current of carbonic acid gas, so as to sweep away the vapour of pyrogallic acid as soon as it is produced, and thus to prevent its further decomposition, which takes place at a temperature very little above that at which it is produced. By this mode of operating Prof. Liebig obtained from 31 to 32 per cent. crystallized acid, and remarks that the full amount of 39 per cent. might perhaps be obtained by a judicious arrangement of apparatus.

On the Relations of Gold and other Metals to Light.—In the hope that the undulatory theory of light, when more fully and perfectly developed, may aid in comparing local actions with those which take place at a distance, and even help towards the comprehension of the physical means by which the latter are carried on, Prof. Faraday§ has endeavoured, experimentally, to subject a ray of light to the action of particles, so small in size as to have an immediate and near relation, not only to the undulations of light, but even to the far smaller motions of the parts of the ether, which are supposed to produce, by their joint and successive action, the light-wave. His hope was, that by choosing particles of a fitting substance, experimental results might be obtained which, in the hands of the mathematical philosopher, might aid in perfecting the theory; and for this purpose gold was selected, because of its high optical qualities, shown in its comparative opacity, whilst possessing a real transparency; its high yellow reflexion and its true green transmission; its known action on light in very minute quantity; its capability of extreme division; its great gravitating force, which could be called upon for aid when the metal was in a state of extreme division; its elementary character; the integrity of its metallic state; the facilities of testing its presence and condition; and, finally, because known phenomena seemed already to indicate differences of action on light consequent upon its division.

The first state of division or attenuation considered, was that conferred on gold by beating into *leaves*. These, with their dimensions and general characters, are well known. Being taken up on glass damped by breathing or moistening, and then water introduced between the glass and the gold as a cushion, the gold can be perfectly stretched, so that when dry it is fit for optical examination; or if a diluted solution of cyanide of potassium be in like manner introduced beneath the gold, it can be more or less attenuated by solution, and then washed and dried. If gold-leaf

* *Archiv. der Pharmacie*, cxxxv., 361.
† *Comptes Rendus*, xliii., 769.
‡ *Ann. der Chem. und Pharm.*, ci., 47.
§ *Proceedings of the Royal Society.*

thus extended and attached, either to glass, or plates of rock-crystal, or mica, be heated, it gradually loses its reflective power and its green colour, and becomes translucent. This change takes place far below the fusing-point of gold, and at a temperature as low as the boiling-point of oil if continued for several hours. When the heat is considerable, the gold-leaf suffers retraction of its parts, and becomes perforated by many fine holes, often symmetric in their form and dimension ; but when the heat applied is the lowest competent to produce the change, it does not seem certain that the effect is due to such retraction ; a good microscopic examination of this point is required. When pressure is applied to such decoloured gold by a convex piece of rock-crystal of short radius (as half an inch or less), the green colour of the transmitted ray reappears. This production of the green colour by pressure can often be referred to in different states of gold, as a proof, amongst others, that the metal is in the metallic condition. Silver-leaf undergoes a like change by heat, at even a lower temperature.

Division by the Leyden Deflagration.—When a gold wire is deflagrated near the surface of glass plates by a strong electric discharge, it is dissipated in minute particles, which are deposited on the glass. These are seen by the microscope to be of different sizes ; but by far the greater part are so minute as not to be distinguishable separately. The general film is of different colours by transmitted light, being grey, violet, or green ; and often on the central or nearest part of the discharge, where the heat has been active, is of a fine ruby colour. All these particles act with acids and chemical reagents as gold acts ; and there is no reason to believe they are anything other than metallic gold. They appear with precisely the same colours and characters, whether the deflagrations are made in common air, in oxygen, or in hydrogen ; and whether the deposits are formed on glass, rock-crystal, topaz, or mica. When heated by any ordinary means, the green and grey parts change to a ruby or ruby-amethystine colour, and that whether surrounded by air or vapour of alcohol or ether. Even after heating, they adhere only as a dust to the plates, except when the temperature applied to those on glass has been very high. Agate pressure confers the green character on the heated deposits, and also, in frequent cases, upon that which has not been heated. All things considered, there can be no reason to doubt that the deposits thus made to vary in the colour of the transmitted light, consist of pure metallic gold.

Thin Films of Gold.—If a very weak solution of chloride of gold, free from excess of acid, and containing about $1\frac{1}{2}$ grain of metal to two or three pints of water, be placed in a very clean glass or glazed vessel, in a quiet place, and then two or three small particles of phosphorus be laid floating on the surface, and the whole covered over and left for twelve or more hours, the gold will be reduced, covering the whole of the surface with a film, thicker near the phosphorus than at other parts. This film may be raised from the fluid by plates of glass, and washed and dried on the plates, and is then ready for examination. The thinner parts of such a film are scarcely visible, either by reflected or transmitted light ; the transition to thicker parts is gradual, the thickest being opaque, and their reflexion that of dense gold. The colour by transmitted light varies, being grey, green, or dull violet. The films are porous, and act as pure gold, resisting all the agents which metallic gold resists. When heated, the transmitted colour changes towards amethyst and ruby ; and then the effect of pressure in producing a green colour is in many cases very remarkable,—even a touch with a card or the finger being able to cause the change.

Gold Fluids.—Whilst the particles of phosphorus are producing a film on the surface, it frequently happens that streams of a red colour descend from them through the fluid ; and if the phosphorus be submerged, and left for twenty-four or forty-eight hours, this red product is easily and abundantly obtained. If the gold solution be placed in a very clean bottle, and then a few drops of a solution of phosphorus in ether be added, and the whole agitated from time to time, the ruby fluid is obtained in a shorter period. This fluid is apt to change in colour, becoming amethystine, violet, purple, and finally blue ; impurities of certain kinds in very small quantities cause this change. It is hardly possible to clean a vessel so well that the first portion put into it does not alter. Most saline bodies produce the change ; a trace of common salt readily makes it manifest. That all these fluids are coloured by diffused particles, is shown by the circumstance, that on being left for a shorter or longer time, the particles sink, forming a coloured stratum of deposit ; many months, however, are required for even the partial separation of the

finer ruby particles. When a light is looked at through the fluid, the latter appears transparent; but when the eye is on the illuminated side, then the fluid is seen opalescent. If a cone of sun-rays be thrown by a lens into the fluid, the illumination of the particles within the cone shows their presence as undissolved bodies. It is believed that all the particles being metallic gold, the ruby are in the finest state of division, the blue in a more aggregated condition. Though the ruby particles, whilst freely diffused, are easily changed in colour, and as it is supposed by aggregation, still they may in some degree be separated by a filter; for on passing the fluid several times through a paper filter, the latter associates much of the rubifying substance with itself, and becomes of a rose colour; it may then be well washed and dried, and contains the ruby particles located, as it is believed, and prevented by their attachment to the paper-fibres from undergoing mutual aggregation. In this state their character is not altered from ruby to blue by salt or acids; they resist those chemical agents which are resisted by gold, but are dissolved by chlorine, cyanides, and the other substances capable of acting on gold. Heated either in oxygen, hydrogen, or air, no change of tint or quality is induced at such temperatures as the paper can bear; or, as far as can be judged, at any higher temperature.

A ruby glass, coloured by gold, is well known. This is considered by the author as analogous to the ruby fluid just spoken of, being a diffusion of gold particles through vitreous matter. The ruby fluid, by association with jelly, is rendered much more permanent than before; and then it may by a little warmth be had in the fluid state, or by cooling as a tremulous jelly, or by desiccation as a hard ruby solid, presenting all the transitions between the gold fluid and the ruby glass. By soaking the dried jelly and then warming it with water, these transitions may be passed through in the reverse direction, and so on, any number of times.

The relations of gold (and other metals) to polarized light, are of the following nature:—A leaf of gold inclined at a certain angle across a ray of polarized light (the inclination not being in the plane of polarization, or at right angles to it) affects it as a thin plate of any uncrystallized transparent substance would do, *i. e.*, the light appears in the analyzer, and the plane of polarization is rotated; or if a leaf of gold be held in an inclined position across a ray of unpolarized light, the beam is polarized as it would have been in passing through a like inclined plate of uncrystallized transparent matter. The gold greened by heating or pressure, when thus examined, does not appear to have acquired any particular tension or structure. Sulphide of carbon and crown-glass are optically so near each other, that a plate of the latter immersed in the former is neutralized; and though placed in an inclined position to a ray of light, either polarized or not, does not then affect it; but gold (and all metals) is still far above either of these. Hence the gold films obtained by phosphorus, when attached to glass, could be examined, and were found to have the optical properties of leaf-gold; the effect having no reference to the *thickness* of the film, but being most perfect in the thinner films, because they were in a more regular and perfect condition. It should be remembered that these films are not continuous layers like coats of varnish or fluid, but easily pervious to vapours. In like manner the deposits of gold (and other metals) obtained by electric deflagrations, were examined, and found to have the same marked qualities in a high degree; places where the film was scarcely visible on the glass, instantly showing the presence of the gold by their action on the polarized ray. In the same manner the very thin and almost invisible films, deposited occasionally on the sides of the vessels containing the gold fluids, showed themselves as gold. The thinnest layer of the fluid itself, however rich in particles, held between two plates of glass, acted no otherwise than a layer of water. It appears by the deflagrations that the particles of gold must be deposited in a plane, and then, though discontinuous, they act in the manner of continuous films of ordinary uncrystallized transparent bodies.

As to the quantity of gold in the different films or solutions, it can at present only be said that it is very small. Suppose that a leaf of gold, which weighs 0.2 of a grain, and will cover a base of nearly ten square inches, were diffused through a column having that base, and 2.7 inches in height, it would give a ruby fluid equal in depth of tint to a good red rose; the volume of the gold present being about the $\frac{1}{500000}$th part of the volume of the fluid; another result gave 0.01 of a grain of gold in a cubic inch of fluid. These fine diffused particles have not as yet been distinguished by any microscopic power applied to them.

EXTRACTS FROM AUSTRIAN PHARMACY.

BY MR. INCE,
Associate of King's College, London.

Pharmacy perhaps is the last thing we should expect in Austria, the home of Music, Art, and the accomplishments of polite society—a land which boasts of Vienna, the most elegant and fascinating capital of Europe, and glories in a cathedral, one of the wonders of the world, at Milan. From such a source we should least hope for grave instruction, or seek to glean materials for prosaic study. Gaiety and Science are not often friends. But, as the wisdom of a nation is said to be wrapped up in its proverbs, the French axiom may be quoted, which declares, *il ne faut jamais jurer de rien*, and the following remarks will show, that even Austria can furnish information to the English Chemist, and contribute something to the Literature of Medicine.

A review of the *Pharmacopœa Austriaca* (editio quinta) has appeared already in the Journal (vol. xv., page 92), besides which a paper bearing on Austria, entitled "Pharmacy in Italy," will be found in October, 1856. The field is not yet exhausted, and I shall endeavour to explore a few remaining points of interest.

The date of the Austrian Pharmacopœia is 1855: it is published by authority at Vienna. Being so recently brought out, no one will be surprised that such modern articles as Collodion, Gutta Percha, Kousso, Mannite, Piperine, Salicine and Santonine are included amongst its preparations: whilst Silver Leaf, Yellow and Red Lipsalve are not thought beneath its notice. All foreign Pharmacopœias have such a strong resemblance to each other, that the present one need not be specially described—a few popular phrases claim an explanation.

1. Acidum Borussicum is Hydrocyanic Acid.
2. Æther Vegetabilis is Acetic Ether.
3. Gas Hydrothionic is Sulphuretted Hydrogen Gas.
4. Sal sedativus Hombergi is Boracic Acid.
5. Spiritus Salis *acidus* is Dilute Hydrochloric Acid.
6. Spiritus Salis *fumans* is Hydrochloric Acid.

Excipulum, is a receiver; fatiscere, to fall to pieces; gibba, a raised notch (thus in the description of the Juniper, "galbuli apice gibbis tribus notati," marked at the apex with three tufts); and sartago, is an evaporating pan.

The entire arrangement of the Pharmacopœia is alphabetical, no distinction being drawn between Chemistry and Materia Medica. Among the list of Herbs, several occur which the London Chemist is often called on to supply, without knowing the source from which the application is derived; such are Herba Calendulæ, Herba Galeopsidis grandifloræ, Herba Saponariæ, Herba Spilanthi, and Herba Tanaceti florida. The Austrian Elæosacchara are stronger than those ordered in French formulæ, being in many (but not in all) cases made with three drops of an Essential Oil to one drachm of Sugar.

The extract of Ignatia Amara, well known this side the water by advertisement, is officially enrolled, and an authorized position is awarded to the Unguentum Juniperi, which lately has been strongly recommended for external use. Scarcely any foreign recipe is met with more frequently than—

I.

INFUSUM LAXATIVUM, OR AQUA LAXATIVA VIENNENSIS.

℞ Foliorum Sennæ Alexand. ℥vj.
Aquæ fontanæ fervidæ ℥vj.
Infuse a quarter of an hour, and add
Mannæ Electæ ℥j. Strain.

Many have been the methods suggested for the Distillation of Rose-Water. Some make it directly from the picked Rose petals, others distil the petals with a certain quantity of Otto, others again use Otto only; and it has even been proposed to mix the Otto with powdered sawdust, and pass steam through the

compound: in addition to these various practices some experienced Chemists are in favour of using pickled Roses; for this purpose Piesse states the best proportion to be 1 lb. of common salt to 6 lbs. of Roses, and Mr. Haselden, 3 lbs. of salt to one of flowers.

These able Pharmaceutists may not be aware that they are marching under Austrian colours:—

II.

AQUA ROSARUM.

℞ Florum Rosarum, *sale* conditorum, ℔j.
Aquæ Communis ℔viij.
Abstrahe ℔iij.

It is always useful to see how common things are made by others, for instance—

III.

NITRATED OINTMENT.

℞ Hydrarg. ℥j.
Acid. Nitric. dil. ℥ij.

Solve caloris ope, et adde

Axungiæ (colatæ
et semi-refrigeratæ) ℥xij.

Mix with constant stirring.

Two formulæ must be mentioned in order to distinguish them from preparations of the same name, which occur in French and German Pharmacy:—

IV.

LIQUOR ACIDUS HALLERI, OR HALLER'S ACID ELIXIR.

℞ Spirit. Vini rectificat.
Acid. Sulph. concent. pur.
āā partes æquales.

In Germany, three parts of Rectified Spirit are added to one of Concentrated Acid.

V.

PULVIS AËROPHORUS.

℞ Sodæ Bicarb. pulv. ℥j.
Put in a blue wrapper.
℞ Acid. Tartaric. gr. xv.
Put in a white wrapper.

This corresponds to what *we* should call a "Soda Powder." The formula for the ordinary Pulvis Aërophorus has been given, vol. xiii. page 468 of the Journal.

How often does the Druggist receive an order for the following—

VI.

SPECIES ALTHÆÆ.

℞ Herbæ Althææ ℔ij.
Rad. Althææ ℔j.
" Liquiritiæ ℔ss.
Florum Malvæ ℥ij.

Chop and mix.

Marshmallow Lozenges are thus directed to be made:—

VII.

TABULÆ DE ALTHÆA.

℞ Pulv. Rad. Althææ ℥iss.
" Rad. Iridis ℥ij.
Sacchari Albi ℥xij.
Mucilag. Tragacanthæ q.s.

Our Trade "Pastilles de Guimauve" are said to contain Marshmallow only as a microscopic object. In the list of reagents, the strength of Solutions is often indicated, as in the subjoined example:—

VIII.

ACIDUM OXALICUM SOLUTUM.

℞ Acid. Oxalic. ℥ss.
Aquæ Destillatæ ℥iv. Dissolve.

Solution of Chloride of Barium, and Solution of Muriate of Ammonia, are both of the above strength.

Lastly, the Austrian Pharmacopœia contains one English word, Arrowroot, and one French designation, Crême céleste, which latter is Cold Cream

IX.

UNGUENTUM EMOLLIENS, OR CRÈME CÉLESTE.

℞ Ceræ Albæ ℥iss.
Cetacei ℥iij.
Ol. Amygdal. ℥iss.
Melt, and add Aquæ Rosarum ℥j.

Austrian Pharmacy stands connected in the popular mind with two empirical remedies: the first is the "Austrian Specific for Cholera." Many will recollect the marvels related of it in the daily papers, as well as the praises lavished on it by English and Foreign officers; and were we to believe one half we see in print, all fear of the Asiatic scourge would vanish. This is the recipe:—

X.

"AUSTRIAN SPECIFIC FOR CHOLERA."

℞ Acid. Sulphuric. gtt. 96.
Acid. Nitric. gtt. 64.
Mucilage ℥iij.
Aquæ Destillatæ *ad* ℥viij. ℿ
(The original formula was expressed in Decimals.)

The second is the nostrum called Warburg's Tincture, the notoriety of which was revived in one of the longest advertisements of the *Times* paper. On examination it is supposed to be Compound Solution of Quinine (gr. vj. in ℥v.), Aloes being an ingredient; if so, the statement by Dr. Livingston, that Quinine is most effective when given in combination with an aperient, receives a curious confirmation.

Another and stranger topic has to be discussed; for a writer would be indeed wanting in his duty who should fail to portray the actual position of the Austrian Pharmaceutist, and here I cannot do better than commence with a quotation from the sketch already mentioned, "Pharmacy in Italy:"—

"Making allowance for the national temperament, which tends rather towards music than physic, the circumstances under which the Pharmacien is placed, are calculated to depress and paralyze, more than to develop his energy and talents."

This alludes partly to political restrictions, but principally to the existence of an all-regulating Tariff, by which the Austrian Chemist is bound hand and foot, and which determines the value of every article he has, from Sarsaparilla down to a one ounce bottle. Into such exact details does the Tariff enter, that it fixes the price of a Decoction, distinguishing between one that requires a quarter, half an hour, or an hour in boiling. The preparation of a cold or hot Infusion—straining and filtration—making an emulsion—the mixing and weighing powders—rolling out pills—covering them with flour—tying, sealing, corking, wrapping and directing medicine, have each a separate price assigned them, which must be scrupulously observed.

The effect of this limitation process is a theme open to discussion. There are some who are enthusiastic about uniformity, and would carry it, at all hazards, into a Chemist's business; others would prefer breaking stones. When "uniformity" may be paraphrased by the word *dead level*, theory should give place to stern reality. Two corpses are uniform in one respect, they are both alike defunct. If every man had equal skill, as well as the same facilities as his

neighbour, and if the commercial value of drugs remained at a constant mark, a feeble argument might then be raised in favour of a private Tariff. As it is in Austria, the public (for whose protection laws are supposed to exist) are served by a man who has neither interest in, nor control over, his own affairs; and the State, by denying personal independence, effectually destroys that spirit of enterprise which alone paves the way either for improvement or discovery.

The further position of the Austrian Chemist may be gathered by consulting the Official Document appended to the Tariff, which is here translated from the Italian. It is published at Milan, date 1855:—

REGULATION OF THE MINISTER OF THE INTERIOR.

Dec. 22, 1854, compulsory throughout all the Provinces of the Empire, relative to the new Austrian Tariff of Medicines.

The Minister of the Interior issues the following orders relating to the new Austrian Tariff of Medicines here subjoined:—

I.

All Pharmaceutists without exception, as well as Doctors, and Surgeons authorized to keep an Apothecary's shop (the so-called "Pharmaceutical Chest"), must, on and after the 1st February, 1855, observe this new Tariff of Medicines.

II.

Those articles which are marked with a cross in this Tariff, or in the new Pharmacopœia authorized by the Decree Oct. 20, 1854 (No 275 in the Bulletin of the Laws of the Empire), may only be dispensed by Apothecaries to a regular prescription from an authorized Doctor, Surgeon, or Veterinary Surgeon. The other articles not specially marked may be sold without restriction.

III.

The several prices in the new Tariff of Medicines will be fixed according to the medical materials they contain, regard being paid to their quality, genuineness, purity, and manner of preparation, according to the prescriptions of the new Pharmacopœia. Medicines must always be dispensed exactly according to the directions of the Pharmacopœia, and those of the medical prescription. Whoever transgresses this rule, will incur a fine of from 50 to 100 florins in each instance.

IV.

The Tariff price of leeches will be determined from time to time for each Province by the respective Lieutenancy or provincial Tribunal, as has been hitherto customary. Those who dispense medicines for public funds will not be allowed any discount on leeches, on their presenting their accounts for reimbursement, as they (leeches) are not to be considered as medicines. All Apothecaries are obliged to be provided with leeches, and all Surgeons are authorized to have them.

V.

The Articles that the new Pharmacopœia directs to be prepared *extempore*, and which are not contained in the new Tariff, will be charged at the same rate as other forms of prescription, whenever the Medical prescription does not point out more precisely the manner of preparation, attention being paid to the formula of the Pharmacopœia with respect to the prescribed quantity of the contents, and to the different materials in their composition, in accordance with the prices fixed by the Tariff, and by the Charge for compounding Recipes.

VI.

In no case, and under no circumstances whatever, is it allowable to dispense medicines prepared from a recipe, having upon it *secundum meam presciptionem*, or any similar observation. Each instance of this kind, as well as the sending any recipe issued by an unauthorized person, will be punished by a fine of 5 florins.

VII.

On each prescription according to which medicines are prepared and dispensed, in any public or private Apothecary's shop, there must be clearly written, in figures, the several prices to be paid according to the Tariff, for the ingredients, for the work and for the containing vessels. If in the calculation any fractions of a carantano remain over, they may be counted in, with the addition of $\frac{1}{4}$, $\frac{1}{2}$ or $\frac{3}{4}$ as the case may be, to make up an entire carantano. The sum total of the several prices calculated

in this manner must be written as the price of the medicine, not only upon the prescription, but also on the directions to be fastened each time to the medicine. The fraction of a carantano which may be left over on the sum total, may be calculated as an entire carantano. Whoever has prepared the medicine in the Apothecary's shop, must write his own name, besides the price of the medicine, on the prescription.

VIII.

Taking into consideration the exactness and precautions necessary in weighing and mixing minute doses of very strong medicines, the Apothecary, or whoever else is bound by the Tariff of medicines, is allowed to count in the calculations of the several prices one entire carantano for each fraction of a carantano which may be left over according to the Tariff, on the total number of drops, or grains of those medicines which are marked with a cross in the Tariff, or in the Pharmacopœia, as well as of those medicines which in the Tariff are charged by grains, when they are prescribed by grains or drops.

IX.

In preparing and dispensing medicines, the Austrian medical weight prescribed in the Pharmacopœia must be rigorously adhered to. Whoever transgresses this rule, will be punished the 1st and 2nd time, as for a transgression of the Tariff (12 of these Regulations), and the 3rd time will incur the penalties threatened in 478 of the Penal Code.

X.

Medicines are allowed to be sold below the charge, but in such cases there must be written in figures on the prescription, and on the direction, in addition to the Tariff price, that to which it has been voluntarily reduced. It is forbidden, under a fine of from 10 to 50 florins, to offer to the public by advertisement any medicines contained in the Tariff at a price less than is there indicated. It will of course be understood that the medicines dispensed at less than the official charge are to be of the quality, genuineness and purity prescribed by the Pharmacopœia, and are also not to be lessened in weight.

XI.

Apothecaries in general are not to try to get customers by any clandestine or prohibited means, nor by bribes. Whoever transgresses this rule, will incur a fine of from 50 to 100 florins.

XII.

Each transgression of the Medical Tariff will be punished the 1st time by a fine of 100 florins, the 2nd by one of 200 florins, and the 3rd as a violation of the Penal Code.

XIII.

Whenever a pharmaceutical assistant shall, unknown to his principal, exceed the charges fixed by the Tariff, he will incur a fine of from 5 to 20 florins, or will be punished by an arrest of from 12 hours to 3 days, so long as he has not been guilty of any action punishable by the Penal Code.

XIV.

All Doctors publicly employed, as well as private Doctors, are charged with the special duty of watching that no transgressions of the Tariff be made, and in case they discover any, they must declare them to the political Authorities.

Notwithstanding, whoever has any reason to believe that in such respects he has received an injury, may prefer a complaint before the competent authority.

XV.

Doctors, or Surgeons authorized to keep the Pharmaceutical Chest and appliances in case of emergency, must get the chemical preparations and compounded medicines which they may require exclusively from Apothecaries, and must only consent to have them from them, with small books in which they write down all the preparations, giving the precise name and weight of the medicines, and the day of purchase, confirming them with the signature of the Apothecary. Apothecaries are obliged to sell to such Doctors and Surgeons the medicines which they require for their Pharmaceutical Chest, at 20 per cent. less than the price fixed by the tariff. With respect to Veterinary Surgeons, the present orders relating to them are to be rigorously observed.

Veterinary Medicines must never on any account be charged at higher prices than those fixed for them by the Tariff. In dispensing them, the charge for the preparation of prescriptions is not to be applied.

XVI.

Besides the above rules, regulations hitherto standing, referring to the procuring, keeping, and selling medical goods and medicines, are to remain in full force.

XVII.

The unauthorized sale of medicines for internal or external use; the sale of prohibited drugs, or medical goods of any unknown kind; the preparing and keeping medicines in any wrong or careless manner; the substitution of one for another, as well as the incautious sale of poison contrary to the regulations respecting it; or any negligence in keeping or separating poisonous goods, will be punished according to the Penal Code.

Date, 1855. BARON DE BACH, M.P.

After these remarks, follows the Official List of Medicines to be kept by Chemists and Druggists, with the Government price affixed to each article. The abbreviations used are:—

Fior.—Fiorino, Florin, one shilling and one penny—(like the British Silver Shilling in Jersey).

The rate of exchange is by no means constant. The Florin bears a different value in many of the Austrian and Papal States, as well as elsewhere. In England, for instance, it represents two shillings.

Car.—Carantano or Carantino, one halfpenny.

Quatt.—Quattrino, the fifth part of a carantano—(equivalent in value to a French *centime*).

Next comes the Regulation Price for preparing Receipts, in which the weights are similar to our own (Troy). ℈iij. are ℥j.; ℥viij. are ℥j.; ℥xij. are ℔j.

Lastly, there is a Tariff for *Containing Vessels* (bottles, boxes, &c.), another for Reagents, and a special one for Veterinary Medicines.

Marius amid the ruins of Carthage would be a fit emblem of an English Pharmaceutist placed under such a system: like the despairing Roman, with unavailing grief he would mourn departed grandeur, and unlike him, following out the modern instinct of the day, he would be prepared to emigrate. Where would be our home establishments, shorn of their patent medicines, their private formulæ and hereditary receipts? Farewell concentrations, prescriptions *secundum meam formulam*, and west-end prices. The law forbids them, and the sorrowing Chemist must restrain his wounded feelings, for he is in a land where the Government allows no Pasma. Nevertheless, the Austrian "Regulation" has its merits—order is established, mutual trade protected, and to a certain extent the public safety guaranteed. The grand fault lies in its doing infinitely too much, and it defends the Chemist's interest much as an army guards a beleaguered city, by placing it under martial law. We are not always in a state of siege.

The Englishman who visits for the first time the gardens of Versailles, or still better the exquisitely ordered grounds of an old French château, views with admiration the trim neatness of the walks, and the faultless pattern of the flower-beds. He is struck with the quaint hedges cut into fantastic shapes, and the long avenues of trees, allowed to grow almost as pretty, though not quite as natural, as the foliage of an Opera forest—and yet when the novelty of the charm is ended, he is content to return to his own green fields and smiling meadows: and if occasionally he is caught by a bramble, or stopped midway by an overhanging bough, he is consoled by the vista of the glorious landscape, where the paths "wander at their own sweet will," and the trees wave in the free air, as God has made them.

31, *Southampton Street, Covent Garden.*

THE INDIAN MATERIA MEDICA.

The Government of India pays upwards of £40,000 a year for quinine alone. Notwithstanding this vast expenditure, the supply might be tripled with advantage. Indents for quinine are jealously watched. At civil stations it is almost refused, and during an outbreak of fever it is always the first article to fall short, and the last to be sufficiently replaced. Of the cost of the remaining drugs we are not informed, but it can scarcely fall short of something like thirty lacs of rupees a year. These two figures are sufficient to prove the importance in an economical view of the substitution of native drugs. On the important benefits their introduction, or rather discovery, would confer upon the people, it is needless to enlarge. To the mass of the population English medicines are totally inaccessible. Almost alone among imported goods, drugs maintain the price they bore in the good old days before the Pagoda-tree had been shaken into barrenness. Men in sickness do not ask the price of medicine. The vendors have every interest in maintaining it. Doctors have little interest in its reduction, and so the good old profitable rates are allowed quietly to endure. The natives do the best they can, sometimes reviving under drugs that would kill any other race of human beings, but usually dying of attacks which the Englishman regards as temporary ills. The evil and its remedy are both understood, and have been pointed out about once a week during the half of the past century. Yet we have done nothing towards obtaining the remedy we all know to exist. There is probably not a medicine imported from Europe, not a costly drug from South America, which has not its counterpart in India. What have we done to discover them? Doctors living alone, without communication with their brethren, occasionally stumble on some valuable plant, some febrifuge or substitute for catechu. They cure all around, satisfy themselves of the correctness of their views, and report to the medical board. The white ants eat the report with gusto, the doctor moves on disheartened to his next station, and there the matter ends. It is useless for the advocates of these effete institutions to talk of the valuable investigations they have suggested or proposed. How many English drugs have they displaced within this generation? It is a result, not a report that is required, and the only one obtained is an immense expenditure. At the present moment there is a committee sitting to ascertain what articles now imported from Europe can be obtained in India. How many drugs will that committee condemn? We will venture to predict not one, though every member of it has probably some vague idea that all the English medicines can be replaced. We need an officer specially appointed for this duty, with power to make researches throughout India, and to compel the services to aid him. Usually all information obtained will be willingly placed at his disposal. It is hopelessness rather than want of energy which leads so many surgeons to leave their information inaccurate or half-digested. No man with brains to devote himself to study will submit his work to a board selected for its age, and still less to a board which is regarded as a sepulchre of records. It is individual persistent energy, solely devoted to this one subject, which can alone accomplish any permanent improvement. A skilled chemist, communicating with all India, testing every drug, and bringing all experience into one focus, would do more in a year to ascertain the true qualities of the native pharmacopœia, than the boards will accomplish in a century. Such an officer would be no very expensive addition to the staff of the medical service.—*Bombay Telegraph.*

ADULTERATION OF BUTTER.

A quantity of butter, which was seized at the shop of a dealer in Liverpool a few days ago by the officers of the Health Committee of the Town Council, was found, on being analyzed, to be thus constituted:—Butter, 47.4; chloride of sodium, 23.4; nitrate of potash, 0.8; vegetable matter, derived from Irish moss or other seaweed, with water, 28.3; total, 99.9. It was an importation from America.—*Times*, April 24th.

POISONOUS PROPERTY OF ANIMALS KILLED WITH STRYCHNINE.

One of the gamekeepers to Lord Middleton having poisoned some rats with strychnine, the dead bodies were thrown upon a heap of manure, where they were partly devoured by some poultry, which immediately fell a prey to the poison contained in the bodies, although these were in a half putrid state.

THE ROOT OF WATER HEMLOCK.

A DISTRESSING case of poisoning, by which the lives of two young men have been sacrificed, has occurred in the village of West Boldon, near Sunderland. John Snowdon, a farmer's son, and William Ridley, a labourer, went out on Wednesday morning to clean a hedge and ditch belonging to the father of the former, adjoining the Newcastle road, and about noon the same day they were found lying paralyzed and speechless in the field close to the ditch where they had been employed. There was a mark of blood on Ridley's face, and a black mark was forming round Snowdon's eyes. A carter saw them first, and, imagining that they had been fighting, gave an alarm, and assistance was brought to them. They were removed in a cart to the village, and medical aid was summoned, but both the poor fellows expired shortly after they were got into a house, and their bodies blackened all over. The medical men gave it as their opinion that both the unfortunate young men had died from the effects of a vegetable poison. A quantity of the water hemlock (*cicuta virosa*) grew in the ditch where they had been employed. One of them at least had been in the habit of eating some simple roots, and, from the fact that the root of the water hemlock was subsequently found with teeth-marks in it near to where the men had been laid after losing their consciousness, and that another piece of the same root was found in Ridley's pocket, there is no doubt whatever but that they were poisoned by eating the root of this plant in mistake for some other. Snowdon was only eighteen years of age ; Ridley was thirty-five, and has left a widow with a small family but meanly provided for.—*Times.*

POISONING BY ARSENIC.

A CASE of accidental poisoning has recently occurred in King's County, Ireland. The following are the facts:—The Rev. James Alexander, LL.D., Rector of Tessauran, who was slowly recovering from a recent illness, sent, on the 16th of March, to the shop of Mr. Edward Whitfield, in Ferbane, for one pound of arrowroot. The shopman, Danis Grogan, not having so much in the bottle, took from a parcel a sufficient quantity of a white powder to make up the required weight. The supposed arrowroot was prepared in the usual way, and Dr. Alexander and his daughter partook of it; the latter, perceiving an unusual taste, ran up stairs in time to prevent her father taking more than a few spoonfuls. Miss Alexander promptly administered mustard emetics and took one herself. Drs. Fry and Peirce were sent for, and these gentlemen found a large quantity of mineral poison both in the food and in the powder which remained, and had no doubt that the portion taken from the parcel to make up the weight was arsenic. The butler and the cook, who also tasted the arrowroot, suffered severely. Miss Alexander is recovering, but Dr. Alexander died on Wednesday night, April 1. After an investigation at Ferbane petty sessions, informations were taken by the magistrates against Grogan for the misdemeanour of carelessly selling poison, whereby life was endangered. He was admitted to bail, himself in £40, and two sureties in £20 each, to take his trial at the next quarter sessions. His master was tendered as surety, but was rejected, on the ground that it might be proved that a similar legal offence had been committed by him, in the careless manner in which he kept articles of food and poison together for sale. Whitfield is described as a grocer, who was in the habit of selling poisons (such as are used by farmers) and medicines of various kinds, and since the accident, rice, corrosive sublimate, jalap, and oxalic acid in different papers, were found in the same drawer, and all under the care of an ignorant boy. The investigation was adjourned to the 13th instant, for the purpose of having the tissues and blood of the deceased examined by Dr. Geoghegan, who stated that he had found arsenic in abundance, both in the arrowroot and in the gruel prepared from it, but had been unable to discover a trace of the poison either in the contents of the stomach or in the viscera, but all the circumstances taken into consideration, left no doubt on his mind that death in the present case was the result of arsenical poisoning. The following is the verdict of the jury: "That on the 16th of March, 1857, a messenger named Charles Quinn was sent from Killy-galley to the shop of Mr. Edward Whitfield, of Ferbane, to purchase arrowroot, which he received from Mr. Whitfield's shop-assistant, named Denis Grogan. That the said Quinn took the arrowroot to Killy-galley, and delivered it to the daughter of the Rev. James Alexander, who had made it into food for her father, which was given to him. That the arrowroot so given contained a quantity of mineral poison, to wit, arsenic, wilfully and without due caution so

delivered to the said Quinn by the said Denis Grogan. That the Rev. James Alexander shortly after got ill, having eaten of the food, and languished until the 2nd of April, when he died from the effects of poison so mixed through the arrowroot aforesaid, and not otherwise.

"We cannot separate without deploring the unhappy occurrence which gave rise to this inquiry, and are of opinion that the existing laws are quite defective, permitting as they do the sale of poisonous drugs by grocers and other unqualified persons; and that improved legislation on the subject is most essential."

POISONING BY AMMONIA.

An inquest was held on Saturday, April 18th, on the body of Mr. James Thompson, son of Mr. Thompson, of Rhodes Street, Halifax, who died from the effects of a large dose of ammonia. The deceased had been in a low desponding state for two years, and had refused to take any medicine save what was given him by Dr. Garlick, the medical attendant. A few weeks since some ammonia was purchased by Mrs. Thompson, for use, when mixed with water, as an external application. The deceased took the bottle, and expressing a belief that it was just the medicine to cure him, was about to drink off a wineglassful, when the servant prevented him. The bottle was then locked up in the cellar; but on Saturday, the servant inadvertently left the key in the door, and deceased procured the bottle, and drank a large draught. He expired in a quarter of an hour afterwards.

The jury returned a verdict, to the effect that deceased drank the poison under a belief that it would do him good.—*Manchester Guardian.*

POISONING BY THE ROOT OF BELLADONNA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As a record of cases of poisoning is generally important as a matter of reference, will the following rather extraordinary and nearly fatal one, arising from the ignorant administration of a decoction of *the roots* of the Atropa belladonna, possess sufficient interest to merit a place in the pages of the *Pharmaceutical Journal?* As exhibiting the rather rare effects of the roots of this plant, it may be perhaps worthy of insertion. On Monday morning last I was requested by a very intelligent medical gentleman of this town to visit with him a case of suspected poisoning by the decoction of the roots of some unknown plant, a very small portion only of which had been sent to him. It appeared that the father had gathered what he supposed to be the roots of the Comfrey (*Symphytum officinale*), but which, on inspection of a part of the root with the young leaves attached, which they had in the house, I immediately recognized to be belladonna, about, perhaps, 2 oz. of which, after slicing, he boiled in water. A portion of the decoction he gave at bedtime to his son, a youth about fourteen years of age, and another portion he took himself. After the lapse of about three hours, the boy (who, it must be remarked, had been previously sick) complained of pain in the belly, dryness of the mouth and throat, and was attacked with *furious delirium.* The pupils were *remarkably dilated*, the *irides insensible to light*, and the vision disturbed. The pulse ranged from 120 to 130, and the countenance appeared anxious but vacant. The father was also, after a rather longer interval, attacked with vomiting. He complained of no especial pain, although the pupils of the eyes were dilated, and the iris not acted upon by light in its natural manner. These symptoms were much less strongly marked than in the son. He complained most especially of numbness of the face and arms, weakness of the legs, and staggering. After a persistence of these symptoms in the case of the father for perhaps six or eight hours, and in that of the son for twelve or fourteen, they gradually abated, and a slight stupor or lethargy passing off, no other unpleasant feeling remained.

I am, Sir, yours respectfully,

Dudley. E. Hollier.

TAMPERING WITH POISONOUS MEDICINES.

On Friday, at the Mary Queen of Scots, in the parish of Jarrow, near the old toll gate in Gateshead, an inquest was held on the body of Elizabeth Bowman, aged 77, the widow of a husbandman. Deceased was an industrious, hard-working woman, going out to wash, and labouring in her humble vocation up to the close of

the past week. She suffered from chronic cough, and felt weak and unwell on Saturday night. At a late hour her daughter, Mary Bowman, purchased for her a pennyworth of "paregoric" (the camphorated tincture of opium) of Mrs. Fenwick (a quarter of an ounce), the whole of which she took at once. She then fell into a profound sleep, under symptoms which inspired alarm; and Mr. Robinson, surgeon, was called in. He found her breathing stertorously, the pupil of the eye widely dilated, the action of the heart slow and laboured, and the whole body in a state of collapse. Suitable treatment was resorted to, but she never rallied, and died on Monday forenoon. The dose of paregoric would not account for death in a younger and more robust person, but in so old and weak a subject as the deceased it might hasten dissolution. The cause of death he should say was serous apoplexy. It was not commonly known, Mr. Robinson observed, among persons who made use of "paregoric elixir," that it was a preparation of opium, in combination with camphor, another powerful sedative. Improperly administered, it was a dangerous medicine, yet, when he was called in to the deceased, and asked if anything had been given to her, the answer was that "she had only taken some paregoric." In reply to the coroner, Mr. Robinson observed, that if no more than a quarter of an ounce had been administered, the quantity of opium taken would be half a grain; but he understood at first that the dose was half an ounce. Deceased's daughter stated, on examination, that her mother objected to laudanum, and when recommended to her by a neighbour, refused to take any. She was not aware that paregoric was a preparation of opium. Mrs. Fenwick, it appeared, dealt in laudanum, but the coroner and jury were satisfied that no mistake had been committed; that paregoric, and not laudanum, had been administered to the deceased. The verdict was therefore "Death from serous apoplexy, hastened by paregoric;" and the foreman (Mr. Guthrie) expressed his opinion that some restriction should be placed on the sale of poisons. He thought it wrong to allow any and every person, however ignorant on such subjects, to vend the most dangerous drugs.—*Gateshead Observer.*

[We insert the above for the purpose of showing the disposition which exists to exaggerate the danger resulting from the sale of ordinary medicines, as "paregoric" can scarcely be called a dangerous poison; and it appears that in this case the quantity taken was less than the maximum dose.—Ed. *Pharm. Jour.*]

PHARMACY IN DURHAM.

We have received the following from a correspondent; and although the meeting appears not yet to have produced all that is desired, we trust the movement will not be lost sight of, and that the desire for improvement in the knowledge of Pharmacy will be attended with the success it deserves:—

"At a meeting held on Thursday evening, February 12th, the following requisition and resolutions were unanimously agreed to:—

"*To the Local Secretary of the Pharmaceutical Society.*

"We, the undersigned Apprentices of the Chemists of the city of Durham, having conceived it necessary that greater facilities ought to be given for the study of Chemistry, Pharmacy, Botany, and the collateral sciences, so as to fit us for the examinations of the Pharmaceutical Society of Great Britain, and the better discharge of our duties, held a meeting, when the following resolutions were unanimously agreed to:—

"That the Apprentices form a class, to meet not less than once a week, for improvement in the knowledge of Chemistry, Pharmacy, Botany, and the allied sciences.

"That the Local Secretary of the Pharmaceutical Society be requested to communicate with the heads of the different drug establishments for furthering the above object."

MATTHEW ROBINSON.

A.D. 1628.

"*Le Médecin malgré lui.*"

The Spanish proverb says, "Old books to read; old wine to drink; old friends to meet." Great is the pleasure of welcoming old friends; of old wine I can give no opinion, as I so seldom get it; but privately I respect the venerable Spaniard, who has mentioned first, Old Books.

The Autobiography of Matthew Robinson is one of these. Fortunately part of his history relates to Physic, and affords a curious illustration of ancient Pharmacy.

Unlike some scholars of a later date, he was a sort of genius while a child; "and such was his ripeness of wit, that before he was nine years old he could translate any English into true grammatical Latin, and construe any familiar author. His father perceiving it, took pleasure in trying him with curter and more difficult Latinists, as Terence and Seneca, and did admire to see how the boy would nick off the very sense of difficult passages, wherein others, three or four years older, could do nothing." Being sent to a higher school, "the holidays and playdays were to him desirable for no other end but that he might be at liberty to read what he list; and by this course he was familiar with every poet and every poetical expression, so that he might have passed for a Laureat ere he was thirteen years of age." His father, "a stout and popular gentleman," died, and his mother was persuaded to send her son to Edinburgh. This was the inglorious time of the civil wars, when Cromwell amused himself with hunting Royalty. Learning was at a discount, arms triumphant, or, to use the expression of the age, "the tents of Mars were more frequented than those of Minerva." Matthew Robinson, however, reached Edinburgh in safety, and began his studies in October.

In February next year the plague broke out, and the students hastened home. "His mother gladly received her son, though much Scottified in his habit and language. Neither was he one day idle at home, but read over at leisure his tedious notes, yet much longed to go to the English Universities." Therefore he set off for Cambridge, not by the Eastern Counties Railway, but mounted on a sorry horse. On the first day he and his companions were chased by robbers. Next day he came to a garrison town, where he was kindly received by the governor, but "appointed to such a mean quarter, that he could take no rest for swarms of night enemies" (the nature of which the Chronicler does not leave to the imagination). He now made for Peterborough; but the very night of his arrival the troops came in, and, by a simple process of displacement, Robinson turned out, and finally, after some adventures, reached Cambridge safely. Entered at St. John's College, he was placed under "the tuition of that darling of men, Mr. Zachary Cawdrey. The tutor doted on his new pupil, and he on his tutor; and to his study then he fell."

Scarcely had he settled to his new pursuits, before the king's army (Charles I.) marched before Cambridge. The students flew, Robinson amongst the rest; but being three times dragged back by the peasants, he determined to fight like an honest man, mounted guard at the Castle by night, and continued his studies by day. The wonderful narration of his varied diligence must be passed over, such details being foreign to the purpose of this Journal. When next we meet him, he is "out of love with College life," and expecting nothing but ruin to the Church by the present times, he betook himself from that occasion to the study of physic. After having witnessed the trial of King Charles, following the English fashion of the day, he was bent on going to Padua as a Doctor, but College interest changed his prospects, and he became a Fellow. "Being thus posted to his own desires, he fell to the perfecting all his former studies. The one he mainly pursued was Physic, his intended profession, and therefore proceeded in drugs as he had done in herbs, and in all Pharmacopœias, acquainting himself with Apothecary shops, and the nature of compounded medicines, and chemical experiments; and in Anatomy he was the most exquisite inquirist of his time, leaving no anatomist unread, nor secret unsearched; insomuch that he was invited by some learned persons in other colleges, many years his senior, to show them vividisections of dogs, and such like creatures in their chambers, to whom he showed the whole history of the circulation, the venæ lacteæ, the cutting of the recurrent veins in the neck, with many experiments then novel, to great satisfaction; and no augur ever was more familiar with bowels than he, every week having some singularity or other

of this nature to search in." These pursuits were not destined to last for ever, for, says the record, "it pleased the most wise God (whose counsels designed him for better employ) to give a sudden check to this his career in medicinal studies, by the vacancy of a church living in his native country, belonging to his family, the presentation whereunto was left to him, as his chief portion. This he thought the greatest affliction that had ever befallen him, to leave his present paradise, and change his course of life and studies: yet the importunity of his mother and dearest relations called him down, and would receive no naysay." The delicate allusion to the profession will not be overlooked, nor when one's mother and one's interest row in the same boat, is the result difficult to foresee. Robinson yielded quietly to his fate, and at the age of twenty-three forsook medicine for divinity. But there is a French proverb, quite as good as the old Spanish one—"On revient toujours à ses premiers amours." And so strong was the ruling passion in him, that the times being "turbulent and factious, so that all sober men judged that it was a deadly crisis, prognosticating nothing but the ruin of both churches and universities, he then sold all his household stuff, and fully prepared in two months' time to resign his living to a worthy and pious divine, his neighbour, and to betake himself to the College again, and his last reserve, the study of physic." Such hopes were never realized—once having entered the ministry, his conscience would not allow him to reject it: with a noble disinterestedness he gave up his fellowship to prevent further temptation, and became "a right textman and practical preacher." Now for the strangest part of the narrative, showing how dangerous is reputation—the public *would* be physicked by him, and the following is the account of a practitioner *nolens volens*, from the original manuscript.*

"He was no sooner settled in his place, but he met with a great diversion to his ministerial employ, for not only friends and relations, but many others well knew that he was brought up a Physician, and therefore consulted him often in their distempers and infirmities; and though he could not peremptorily decline such importunities, yet he did with much modesty answer their desires, yet still referring them to the advice of more experienced Physicians for many years. But his name being once up, he could not continue himself longer in that privacy. Among many gentlemen thus applying to him was Sir Joseph Cradock, the Commissary of the Archdeaconry of Richmond, who often consulted him for himself and family with great success; but finding him shy and nice in writing bills (*i. e.* prescriptions) or anything that looked like a professed Physician, he sent to him under the seal of the office a license to practise physic, that he might not have any excuses longer, and this proved to him a great unhappiness. For he was sent for by some dukes and peers, with many baronets, knights, and great men upon the like account; some of whom (as being at too great a distance) he absolutely refused, others he was induced to gratify, that of friends he might not make them enemies. Insomuch that in short time, he had but little time left him to his own studies, being three or four days per week, and often more, carried unwillingly abroad to visit patients. In his medicinal practice he had prodigious success, especially in the checking and curing of consumptions (being well instructed from his own hectical constitution, as well as from books): and in that he had a peculiar method of his own, known then to few, or none, but such as after took it up from him. No man had a steadier judgment of pulses and patients, for he could see danger at a great distance, and rarely missed in his prognostications, and therefore, in all such cases, he pressed the counsels of abler Physicians. And though he refused to undertake the cases of many patients, seeing them desperate, he never denied any to join in counsel with the most learned Physicians of the land; often reporting those odd cases of patients even to the College of Physicians, by a polite Latin pen, whereof he was a great master, as well as of the Latin tongue."

One more extract will complete the scene:—

"But his concerns still growing upon him, both at home and abroad, he was very weary of these avocations given him by patients, studying all honest excuses

* *Autobiography of Matthew Robinson.* Edited by J. E. B. Mayor, M.A., Cambridge.

to shift them off, yet could he not fairly rid himself thereof for twelve years, till it pleased God, about the fifty-fourth year of his age, to give him a writ of ease." This was a painful malady, which "prevented him from walking, coaching, or riding," and which, by setting him free from his professional labours, at last restored him to the church.

This wonderful man united in himself many seemingly anomalous characters—though learned, he grew rich; though rich, profusely liberal. He was a noted judge of horses, an accomplished sportsman, and a celebrated divine—how excellent a Physician has been seen already.

A light that shone so brightly in the seventeenth century, deserves not to be forgotten altogether in our own.

JOSEPH INCE.

31, *Southampton Street, Covent Garden.*

REVIEW.

ELEMENTS OF CHEMISTRY, THEORETICAL AND PRACTICAL. By WILLIAM ALLEN MILLER, M.D., F.R.S., Professor of Chemistry in King's College, London. John W. Parker and Son, West Strand.

WHILE publishers and authors are generally endeavouring to meet the popular demand for small books and works of easy reading, we are glad to find that the old-fashioned thick octavo is not altogether replaced by the modern manual.

Dr. Miller's work forms three octavo volumes, containing upwards of 2000 pages. It belongs to the class of the larger and more complete systematic works on Chemistry, designed for the use of students. The work is divided into three parts. The first part treats of *Chemical Physics*, the second of *Inorganic Chemistry*, and the third of *Organic Chemistry*.

The part treating of *Chemical Physics* is more copious and complete than any other modern elementary work on the same subject in the English language. It bears some resemblance to that part of the late Professor Daniell's *Introduction to Chemical Philosophy* relating to physics. Indeed, the author states that, as he was "originally a pupil of Professor Daniell, and was subsequently, for several years, associated with him as Lecturer on Chemistry, it has happened that in some of the subjects treated of in this volume, the thoughts and mode of arrangement resemble those adopted by that distinguished philosopher." It must not be supposed, however, that Dr. Miller's work forms a new and modernized edition of, or even that it is founded upon, Daniell's very excellent and once popular treatise. The present author, equally with his predecessor, possesses the power of well arranging, and lucidly yet concisely describing the subjects of which he treats; and any resemblance between their respective works may be referred to this, and to the fact of their having long worked and lectured together, rather than to a copying by one of the style and matter of the other. Moreover, it is only in the first, or physical part, that the reader is reminded of Daniell's mode of treating the subject. This was the best part of Daniell's work, and it is a very important part of the work before us, occupying as it does upwards of 400 pages. The student will find here a clear exposition, well illustrated, of the results of investigations in chemical physics, brought up to the period of publication.

The part treating of *Inorganic Chemistry* occupies about 750 pages. The arrangement here partakes somewhat of a natural historical character. The principles of chemical nomenclature having been explained, the student is led to examine the atmosphere, to determine its composition, and to study its principal constituents, oxygen and nitrogen. He is then taken to the examination of water, and of the element hydrogen. From thence to carbon, carbonic acid, and carbonic oxide. Then follow the compounds of nitrogen with oxygen and hydrogen, and the other non-metallic elements and their compounds. Before entering upon the individual descriptions of the metals, the author gives a chapter upon the general properties of this class of bodies, and of their compounds with the non-metallic elements, and explains the theories of the constitution of salts. Exception may perhaps be taken to the classification of the metals which is adopted, but all such classifications are more or less defective. The author, after respectively grouping together the metals of the alkalies, alkaline earths, and earths, forms a group of "metals more or less allied to iron," which includes zinc, cadmium, cobalt, nickel, uranium, iron, chromium,

and manganese, then gives a group of "certain metals which form acids with oxygen," a separate group of "bismuth, copper, and lead," and lastly, the group of "the noble metals." It may be doubted whether this is the best classification that could be adopted, or, indeed, whether any advantage results from grouping the metals in this way under definitions which are obviously imperfect and tend to convey erroneous impressions to the mind of the student. This part of the work contains a great deal of valuable practical information, and fully justifies the designation adopted in the title of the book.

The last part, which treats of *Organic Chemistry*, is that which might be expected to present the greatest difficulties in making a satisfactory selection and classification of matter. We congratulate the author upon the successful issue of his labours in this department of the work. The arrangement, although dissimilar to that of any other author that we are acquainted with, is, we think, the best that could have been adopted, considering the object in view, and the present condition of the subject.

Dr. Miller's work is a valuable addition to our chemical literature. It will supply the student with a manual adapted for his advanced studies, and may be consulted with advantage by the practical man, who will find here a comprehensive summary of facts, and ample details relating to the most important processes in the arts and manufactures.

TO CORRESPONDENTS.

We have received an anonymous communication, inclosing a specimen of extract of taraxacum, but for what object we cannot tell.

Amator Scientiæ thinks the one thing wanting to make good Chemists to be "one fold, one shepherd," to consist of a Training School for Youths, and a College for Pharmaceutical Students; private apprenticeship to be abolished, and the premiums paid to the general funds of the College!!!

J. F. (Newton).—(1.) The *Floræ Capensis* is not published in this country.—(2.) The references alluded to are to botanical authorities—Nees von Esenbeck, and Stephenson and Churchill. The price of the work of Nees von Esenbeck is about £15.

M. (Poole).—Distillation would answer the purpose.

T. (York).—(1.) Lindley's *School Botany* is suitable for a beginner.—(2.) See page 536 of our last number.—(3.) The expense of attending the School of Pharmacy for a session would greatly depend on the habits of the student; with economy, probably £80 (including a moderate sum for board and lodging).

J. T. (Hastings).—The books most suitable are mentioned at page 440 of our February number, and may be obtained through any bookseller.—(2.) Yes.

An Australian (Strand).—(1.) Dissolve in nitro-hydrochloric acid, and precipitate with protosulphate of iron.—(2.) Evergreen.

A Member.—We have no formula for "egg powder."

Chemicus (Scarborough).—*Gingerine*. See vol. xv., page 192.

L. O. (Great Malvern).—We know no formula for Arnica Plaster. It might be made in the same manner as Emplastrum Belladonnæ.

A Member (Pershore).—(1.) A clear solution of potassio-tartrate of iron in syrup may be made by first adding a small quantity of water.—(2.) *Unguentum Potassii Iodidi*, if made according to the Pharmacopœia, is colourless, provided pure lard be used.

W. L. (Dundee).—The receipt of the article from the *Glasgow Herald* is acknowledged with thanks.

X. Y. Z.—(1.) Certainly not.—(2.) Sumbul root, ℥ij.; proof spirit, Oj.

A Lady.—We fear that the only remedy is time.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. XII.—JUNE 1st, 1857.

LEGISLATION AGAINST POISON.

We have printed entire, in another part of this number, the "Bill intituled an Act to Restrict and Regulate the Sale of Poisons," which was alluded to at the Adjourned Annual Meeting of the Society on the 22nd of May. The Bill was not printed in time for discussion on that occasion, as copies of it could not be obtained until after the close of the meeting. It will be the duty of the new Council at the first meeting, to be held on the 3rd of June, to consider the provisions of this measure, and to take such steps as may appear expedient for protecting the profession and the public against such an infliction. The subject will also be discussed at a Special Pharmaceutical Meeting, to be held at the house of the Society, on Wednesday evening, June 3rd. Although it cannot be supposed for a moment that the Bill is at all likely to be passed in its present form, yet the principle displayed in it may be taken as an indication of the direction in which legislation is tending, and the experience of those who are practically conversant with the subject must be brought into requisition to expose the absurdities of the measure, and to point out the boundary-line between the sublime and the ridiculous.

That it is desirable to place some check upon the facilities for obtaining dangerous substances, and to adopt the most effectual precautions that can be devised against accidents in the use of domestic medicines, is a proposition which admits of no dispute; and it should be the primary object of any measure which may be introduced for the purpose, to increase the difficulty of criminal poisoning without needless interference with the prerogative of the medical profession, the requirements of art and science, and the general convenience of the public.

No professional sagacity is required to expose the impracticability of some of the proposed regulations in the Bill now before us. This has been forcibly pointed out in the *Times* of May 22nd, where the dilemma of a person requiring a few drops of laudanum for toothache or any other ailment is described by way of illustration. This, however, is only one instalment of the perplexity; a new "field of usefulness" (?) is here imposed upon the clergy and on justices of the peace, who will be liable to be called upon at all hours for certificates by persons requiring poison, whether for medicinal use, for purposes of trade, or for scientific processes. It may be a question with medical men when thus applied to whether the certificate does not imply or include professional advice, entitling them to a fee. It will of course be necessary to have printed forms of certificate, and in consequence of the difficulty of obtaining the medicines enumerated in Schedule A in cases of emergency, prudent persons will find it expedient to be provided with a stock of such medicines, so as to avoid the dilemma described in the *Times*, and as the supply of all articles of consumption is regulated by the demand, we may expect to see advertised among other domestic remedies, "Convenient travelling chests, containing all or any of the medicines in Schedule A, in angular blue bottles, with black and white labels, as the Act directs."

The provision that all the scheduled poisons are to be kept in a separate place under lock and key will entail upon the dispensing Chemist an amount of inconvenience which our readers will generally appreciate. It may be very proper

that some dangerous substances should be so kept, but by including in the list a variety of medicines which are in constant use, the closet or poison chest would be continually open, to the great alarm of the public if in the front shop, or the no less inconvenience of the dispenser if in a remote part of his premises.

While these theoretically conceived restrictions would impose upon the honest and suffering public an incalculable amount of inconvenience, the list of excepted poisons in Schedule B, and the proviso in sections 8 and 9—not to mention the innumerable catalogue of poisons to which the Act is inapplicable—would leave the criminal poisoner in full possession of all the facilities which he could desire for his purpose. The fact that poison certificates are in constant requisition by persons of all classes would remove suspicion in each case, and the notoriety of the various legitimate purposes for which poisons are daily used, would be a convenient cloak for the criminal, who might refer to the 11th section for a pretext, in case of need.

The natural result of such an Act of Parliament would be an extension of the public familiarity with poisons, and such familiarity would tend more to assist the criminal poisoner than it would to protect those who purchase poisons for legitimate purposes.

The impracticability of the angular and blue bottle scheme, as a regulation for universal adoption, has already been pointed out; and, even if it were practicable, it is simply an expedient for superseding the use of the senses, and enabling careless nurses to administer medicine without taking the trouble of reading the label. It would also give a fallacious confidence in the contents of round bottles, which, although they might not be included in Schedule A, would in many instances require quite as much care and accuracy in the use.

The form of certificate in Schedule C is signed by the vendor a "licensed Druggist." What is a licensed Druggist? By whom is he to be licensed? Does it mean Pharmaceutical Chemist, or is it in contemplation to empower the clergy or justices of the peace to grant the license to any huckster or oilman who may have a corner of his shop dedicated to Schedule A?

The responsibilities provided by the Bill are very severe. For the sale of any poison save as authorized by the Act—that is to say, without the required certificate, entry, signature, &c., or in a bottle of the wrong colour or shape, or without a label such as the Act describes; for failing to keep any poison under lock and key; or for any other infringement or evasion of the Act, the penalty is not exceeding £20 for the first offence, and £50 for any subsequent offence. *The person so convicted of any second or subsequent offence is to be for ever thereafter disabled from selling any poison, or carrying on the business of a Chemist and Druggist*; and a person so disabled is to be liable to a penalty of £50 if he should at any future time sell any preparation containing poison, or any drug or medicinal substance whatsoever!

If such an Act of Parliament should be passed, and not duly enforced, it would resolve itself into a Pharmacopœia for the instruction of criminal poisoners; if enforced strictly to the letter, every Chemist and Druggist in the kingdom might expect within twelve months to be legally "disabled" from carrying on the business, and the race would become extinct.

Whatever may be the fate of the Bill, its appearance as a literary curiosity will serve to demonstrate the extreme difficulty which attends legislation on this subject. Practical men were previously aware of the difficulty, and have never aimed at the utopian scheme of superseding the ordinary use of the senses by parliamentary precautions no less complicated than ingenious. To theoretical legislators, therefore, we are indebted for this effort of imagination, which, when submitted to the test of experience, will be found to be based on erroneous principles.

In reverting to the various cases of accidental poisoning which from time to time occur, and of which we have lately published a number of examples, it will

be observed that in a large proportion of the cases the accident may be attributed to the sale of poisons by incompetent persons, or to the neglect of some ordinary precaution, such as labelling the bottle or giving proper instructions as to the dose. In the Bill before us no allusion is made to the qualifications of the parties by whom poisons are to be sold, nor to the distinction which is now recognised by Act of Parliament between Pharmaceutical Chemists and unqualified persons who sell drugs by sufferance. The introduction of the term "licensed Druggist" shadows forth an imaginary distinction, which may be beneficial or injurious, according to the mode in which the idea is developed. The precautions proposed to be enforced are of that complex nature which it would be impossible universally to carry into practice, and every deviation from the supposed system of restriction would give rise to a fresh source of danger. For example, it is assumed in theory that a bottle of the right size and of the shape and colour defined by the Act, will always be at hand whenever any poison is to be sold, and that such bottles will not afterwards be used by the public for any other purpose. Practically it is well known that this will not be the case, and that consequently the precaution, if *relied upon*, would be worse than useless. The proposal to colour all poisons with indigo, soot, or archil, is too absurd to be seriously discussed in this Journal.

We have not attempted, on the present occasion, to criticize minutely the details of the Poison Bill, or to add anything material to the opinions which we have previously expressed as to the nature of the remedy which we consider best adapted to the object to be attained. The subject will shortly be discussed by the Council, and will also be brought under the notice of the Members at large, which will afford an opportuity for reducing into a practical form the result of the experience of those who are best acquainted with the subject.

The following extract from the article to which we have already alluded in the *Times* of May 22, directs attention to the most important and practical aspect of this question:—

"We place much reliance upon the gradual extension of scientific and general intelligence among the Druggists as a class, and regret that the trade cannot be brought under more stringent regulation, for no restraint of police or statutory check would be so efficient as that check and that restraint which educated Druggists would themselves supply. It is not absolutely necessary for the public convenience that deadly substances and drugs should be sold at every village shop, and we think some provision for confining the sale of such articles to properly accredited establishments might be introduced with advantage."

THE PRIVILEGES OF PHARMACEUTICAL CHEMISTS.

When a class of persons, after protracted efforts, have succeeded in obtaining a certain amount of advantage—whether it be position, influence, or substantial privileges—it is policy to continue to look forward and make the best use of the step already taken. While some of the parties concerned may be disappointed that greater progress has not been made, and others may be content to be spared any further trouble, those who are steadfast in the cause never lose sight of the original object of their ambition until their exertions have been rewarded by complete success.

The Pharmaceutical Chemists in this country have made a step in advance, and were never in a more favourable position for extending their sphere of usefulness, and rendering a service to the public, than at the present time. The House of Commons is paralysed by the mystification of Medical Bills; the House

of Lords is floundering among narcotics; the Press is uneasy on the subject; and the Public is more or less affected by the panic to which recent disclosures in parliamentary reports, sanitary commissions, and coroners' inquests have given rise.

Certain projects are under deliberation emanating from parties not practically conversant with the subject on which they have undertaken to legislate. The experience of the Pharmaceutical Chemist is required to solve the difficulties which have arisen, and to point out to what extent and in what manner a remedy may be most judiciously applied to meet the requirements of the case.

In coming forward under these circumstances to assist in the undertaking, the Pharmaceutical Chemists will, at the same time, confer a benefit on the public, and advance their own position and influence. No legislation on this subject can be effectual or consistent unless it recognises a qualification for dealing in poisonous medicinal substanes. It would be absurd to inflict a penalty of £10 for selling a quarter of an ounce of laudanum in a bottle of the wrong colour and shape, and at the same time to permit an illiterate apprentice in a huckster's shop to serve arsenic, nux vomica, arrowroot, oxalic acid, or Epsom salts, to any customer who may apply, even if provided with a certificate and a witness. The primary and most important question to be considered is—to whom should be entrusted the responsibility of selling and compounding those medicinal substances which are comprised in the list of poisons? It should be the policy of our members, whenever such questions arise, to come forward and take the position which the law has given them as the representatives of Pharmacy, claiming to be recognised in any Act of Parliament that may be passed with reference to the sale and dispensing of medicines, and offering such assistance as their experience may enable them to afford on the subject.

Some Members, however, instead of taking this course, appear to undervalue their privileges, and amuse themselves by scrutinizing the statistics of the Society, with a view of proving, if possible, that it is in a retrograde state. They deduce this inference from the fact that a few mushroom supporters, who came in at a moment of excitement a few years ago, evaporated like dew before the sun at the sight of the collector. But it is important to remember that the intelligent and influential Members remain, and that the moral and professional influence of the Society are daily increasing. It may be a question for serious consideration in what manner grocers, hucksters, and other incompetent persons are to be restricted in the sale of poisonous drugs, and whether any system of licence shall be adopted with reference to this branch of trade; but there can be no doubt as to the position and status of Pharmaceutical Chemists, who are at the present time acknowledged by law to be qualified, and who are the parties most capable of assisting the Legislature in the settlement of this question. An extension of the privileges of this class would conduce to the public benefit by inducing a larger number to qualify themselves, which would gradually increase the supply of trustworthy dispensers of medicine.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS (*continued*).

Bell, James .....Manchester
Bentley, Walter .....Brighton
Goode, Charles .....Congleton
Hambrook, John Baker.....Dover
Hall, Robert .....London
Parkinson, Robert .....Bradford
Rowntree, Thomas.....London
Willows, John.....London
Williams, Thomas .....London

CONVERSAZIONE.

A Conversazione was held at the house of the Society on Tuesday evening, the 19th of May. Among the subjects provided for the entertainment of the company on this occasion, electricity and photography were most prominent. Very powerful galvanic batteries were used for showing the electric light and for charging the great electro-magnet, and a very powerful induction coil. A battery, consisting of eighty of Grove's cells was employed for the electric light, which was kept in operation, with a few intermissions, throughout the whole evening. A good deal of attention has been given to this subject lately by electricians, with a view to the construction of apparatus for rendering the light constant and uniform. Two of the instruments intended for this purpose were in use on the present occasion—one contrived by Mr. W. Squire, and the other, a modification of Mr. Squire's apparatus, by Messrs. Murray and Heath, of Piccadilly. Mr. Squire superintended the use of these instruments, and showed that the light can be maintained with very little variation, and only an occasional intermission, when it may be immediately restored by an attendant. A splendid beam of pure light was thrown from one of the windows of the house in different directions to a great distance, to prove its applicability for lighthouses and other similar purposes. The same battery that was used for the light was at intervals applied to the great electro-magnet, with which some of the results of the magnetic force were shown.

Other effects of electricity were exhibited in a darkened room, where a powerful Ruhmkorff's coil was used for giving to galvanic electricity a high degree of tension, resembling in this respect the electricity of the machine. The induction coil was kindly lent for the occasion by Mr. Gassiot, and the experiments were shown by Mr. Ladd. In this room experiments were also made by Messrs. J. L. and L. Wheeler, of Brixton, with their new gas-carbon battery, which is a modification of Grove's battery. This battery was described a short time ago at a meeting of the Chemical Society. The platinum plates of Grove's battery are replaced by plates of coal-gas carbon (the hard carbon which is deposited on the inner surface of coal-gas retorts). In this way the great expense of Grove's battery is avoided, while the power appears to be undiminished.

In connexion with the subject of electricity may be mentioned the magneto-electric step-by-step telegraph, which was exhibited by Mr. Siemens, of John Street, Adelphi. This instrument possesses the advantages of great simplicity, entire suppression of the battery, and capability of working through a great length of line-wire (having been worked through 3000 miles) without intermediate relays. It is intended chiefly for railway companies and private telegraphs, requiring only one line, and being always ready for work. The instrument called the indicator consists of two permanent magnets fixed to a frame, with the opposite poles turned towards each other, between which are placed the moveable poles of an electro-magnet. Positive and negative

currents passing in succession through the coils of the electro-magnet, cause a reciprocating motion of these poles, which are therefore successively attracted by the two permanent magnets. By this motion a needle is turned on a dial step by step, showing the different letters and signs. The electric current is produced through a second apparatus called an indicator, which consists of several permanent steel magnets, having one common anchor made of a soft iron core covered with insulated copper wire, and fixed so as to revolve in two bearings. This anchor is turned by means of a wheel and pinion through the crank fixed over a dial, showing the letters and signs corresponding with the indicator. By each half revolution of the anchor a current is produced alternately negative and positive, which passes through the coils of the indicator, moving the needle as mentioned above.

There were also specimens of all the submarine telegraph cables, which were contributed by Mr. Bentley.

Another application of electricity was exemplified by a series of very beautiful electrotype copies, in copper, of sculpture in *alto-relievo*. These, which are of French production, are some of the best specimens of the art we have seen. They were exhibited by Mr. Richard Knight.

The display of photographic pictures and stereoscopes comprised the productions of the most eminent artists in this department, including Mayall, Maul and Polyblank, Kilburn, Hughes, Williams, Knight, and others. From these sources were derived a large collection of portraits of eminent men, and pictures of all sorts. Messrs. Murray and Heath, Messrs. Horne, Thornthwaite, and Co., and Mr. Piggot also contributed to this part of the collection; and Mr. Olley contributed some well-executed micro-photographs.

Mr. Bower, of Tottenham Court Road, exhibited some specimens of *Glover's Patent Enamel Photographs*. The pictures taken by this process possess the advantage of having a white ground, and yet of being very translucent. They are stated to be more permanent than the ordinary photographs. The process is applicable to the production of painted windows, ornamental lamps, &c. The patentee also proposes the application of his process for manufacturing purposes. He says, "It can be applied to the production of clock and chronometer dials, watch dials, thermometers, barometers, compass faces, and tablets of *every description*, ensuring a degree of accuracy never yet attained by the engraver. They can be produced at less than one-third the cost of the materials at present in use for the above purposes, and far excel in appearance anything ever yet attempted. It cannot be injured by any length of time or atmospheric changes, and can be washed as an ordinary piece of porcelain. Another important consideration in the present invention is, that the printing of the photographs can be carried on by gaslight."

In addition to photographic pictures, there were a number of paintings in water-colour and in oil, which were supplied by Messrs. Vokins, and some beautiful figures, vases, &c., in porcelain, supplied by Mr. Sharpus.

The Master of the Mint contributed a case containing a complete collection of the war medals, the counterpart of one which was recently fitted up for her Majesty.

Among the apparatus exhibited, we may mention Knight's new soda-water apparatus, which was described in a recent number of this Journal. On the present occasion Mr. Knight had his apparatus in operation, and afforded to hundreds of the visitors a practical demonstration of the facility with which aërated waters may be made with it, and of the excellence of their quality.

There was a drawing of the new patented apparatus of Dr. Normandy, for the distillation of sea-water, and the production from it of good potable fresh water. This apparatus has been recently fitted up by the Government on the island of Heligoland. Also Normandy's steam-valve for equalizing the pressure of steam, as supplied from the boiler. Messrs. Elliot Brothers supplied some apparatus, including a small model hydraulic press, capable of exerting a pressure of sixty cwt.; Messrs. Horne and Thornthwaite, some sets of educational apparatus, such as are supplied at a very low price for the use of schools;

Mr. Griffin, a double action air-pump on Tait's principle, the barrel being placed horizontally beneath the plate; Mr. Rooff, charcoal and other respirators, and other apparatus; Messrs. Gwynne and Co., a patent barometer, of which the following is a description:—The instrument consists of an inverted glass syphon, sealed at one end and open at the other, partly filled with mercury, and suspended, so that the two limbs of the syphon form the arms of a balance. The invention consists chiefly in supporting or balancing the instrument on points, pivots, or knife-edges, or suspending it by a flexible material, as a silken cord, a fine flexible steel spring, &c., which allows the instrument to vibrate or oscillate freely, and a pointer or hand fixed to the instrument, and moving in front of an index or dial, shows by its motion the most minute change in the atmosphere. Any increase in the pressure of the atmosphere forces the mercury towards the sealed end of the tube, giving a preponderance to that side of the syphon, and, consequently, motion to the instrument; while a decrease in the pressure produces an effect in the opposite direction. A great many varieties in the arrangement of the instrument may be made.

Dr. Hofmann contributed a new form of combustion furnace for organic analysis, in which the heat is produced by the combustion of gas. Several arrangements have from time to time been suggested for this purpose, of which that exhibited on the present occasion is the most recent.

Among chemical and pharmaceutical products, and articles of Materia Medica, claiming notice on the score of novelty or superior quality, were the following:

A specimen of hydride of amyle, a new anæsthetic agent recently introduced by Dr. Simpson, of Edinburgh, from Messrs. T. and H. Smith, of Edinburgh. See page 604.

A specimen of pure benzine or benzole of English manufacture, and a solution of gutta percha in the same, from Mr. Bolton.

A new purple dye, obtained by the oxidation of aniline, together with specimens of silk dyed with it. This is the discovery of Mr. W. H. Perkin, of the Royal College of Chemistry, by whom it has been made the subject of a patent.

Paraffine candles, made from Irish peat, from Messrs. J. C. and J. Field.

Specimen of vanilla from the Mauritius, from M. de Valancé.

Chinese green dye, prepared from the stems of a species of rhamnus, and recently introduced into France, from Mr. D. Hanbury.

The fruit of St. Ignatius's bean, and a new variety of cassia fistula from South America, from Mr. Morson.

Fine crystals of sulphate of manganese, from Mr. Squire.

A fine specimen of sublimed chloride of chromium, from Mr. Braithwaite.

A specimen of the ordeal nut, and of a tincture of Montcenillier wood, used in Guinea for judicial poisoning, from Dr. J. H. Gladstone.

Specimens of dried plants and ferns were contributed by Mr. Bird; a collection of Australian plants by Mr. Sandford; and two branches of the olive-tree, one from the Mount of Olives and the other from Bethlehem, by Mr. Palmer.

SIXTEENTH ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 20th.

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

The President, in commencing the business of the Meeting, said that although there was nothing at the present time connected with the affairs of the Society to cause any great excitement amongst its Members, yet there was now quite as much reason for their taking interest in it, and using their energies in promoting the objects for which it was established, as on any previous occasion. It was true that at the commencement of an institution many difficulties had to be overcome relative to the mode of carrying out its objects, which gave rise to discussion and probably disagreements, causing much excitement among its Members, which might be compared to laying the foundation of a house where rocks and other obstructions required to be cleared away before building the walls of the edifice;

but when that was overcome, instead of expending their energies in disputes and arguments, they had an opportunity of bestowing them on the objects for which the Society was established. All were unanimous as to the advantages of associating themselves together for their mutual improvement, benefit, and protection, as well as for the protection of the public, and there could be no doubt as to the policy of keeping their shoulders to the wheel so as to take advantage of their past labours, and by a perseverance in the same course to overcome future difficulties. On looking over what had transpired during the past sixteen years, it appeared to him that they might gain some useful information for their future guidance. It was quite true that the Society was not precisely the institution first aimed at, because they originally contemplated obtaining some exclusive powers from Parliament, such as prohibiting all persons but Pharmaceutical Chemists from opening shops as Chemists and Druggists. To expect this to take place in their own time was probably expecting too much, as the ground on which they could deserve exclusive privileges must rest on qualifications which many of their body did not possess, and it was, therefore, necessary that a probationary period should exist, during their transition from their present state to that of a recognized, educated, and properly qualified profession. A very obvious preliminary step to be taken was to obtain the recognition of the Legislature, in the form of an honorary distinction; and having obtained this, it depended on themselves to substantiate their claim to further confidence, and an enlargement of the benefits which it was hoped would ultimately result to the profession and the public from the establishment of the Society. He often heard it asked, "*qui bono?*"—what advantages resulted from becoming Members of this Association; and his answer was, that the public were beginning to understand that a Pharmaceutical Chemist was more to be depended on than an ordinary Chemist and Druggist, and that consequently those who were Members of the Society were more likely to enjoy the confidence of the public and be patronised by them than non-members. Many young men appeared to be aware of this fact, and they took pains to qualify themselves to pass an examination, and in future none would be admitted to Membership but those who had qualified themselves accordingly. By that means they would attain indirectly that benefit for the public and their own professional character which they had been endeavouring to obtain by more direct means. To induce persons to undergo a voluntary examination it was necessary to make it as honourable a distinction as it could be; but it would have been improper and impolitic, in the first instance, to throw difficulties in the way of it by making it a very formidable ordeal. He was happy to say that the opportunities for qualifying had greatly increased, and the means of education now existed to any extent that pupils desired through the medium of this and other institutions. It had been suggested that the examinations in future might be made more complete by increasing the facilities for the practical part—such as dispensing prescriptions, spreading plaisters, and the other duties of the shop. These examinations had not hitherto, in this country, been carried out to the full extent, and consequently the objection occasionally made against them, that they were rather theoretical than practical, had been urged with some reason, from young men who had been able to answer chemical questions satisfactorily being found deficient in some of the manipulations behind the counter. The experiment, as far as it had been tried, led the Board to believe that these defects might easily be overcome, and that by making the examinations more complete and more practical the distinction would be considered more honourable, and this would increase the desire of young men to come up and obtain the diploma. He hoped the time would arrive when the examination would be conducted publicly in this country as in France, and the Members would thereby have an opportunity of judging for themselves as to the efficiency of the proceedings. In looking over the events that had occurred since the establishment of the Society, he had been constantly reminded of the great services of their late Secretary. He and Mr. Smith, with many zealous founders of the Society, had worked together even before its existence to devise some constitution for it, and to reduce its elements into a tangible form. It was impossible to overrate the zeal and energy which Mr. Smith had thrown into the work, and as the Society increased, his exertions and experience had grown with it, so that no one connected with the Institution was so conversant with the business as Mr. Smith. The Council were not conscious of the full value of his services until he was suddenly incapacitated by illness. It was only when they lost a valuable officer that they became fully aware of his worth, and the Council had found considerable difficulty,

from the correspondence and other work being in arrears consequent on his retirement. He (the President) took that opportunity of expressing regret at the delay and disappointment that must have occurred to some Members from the fact of the business of the Society having fallen into some unavoidable confusion during the interval following Mr. Smith's illness until the appointment of his successor. The Council were now getting the work into order, and by the efforts of their present Secretary they hoped soon to overcome the difficulty which the sudden loss of an officer who had grown with the Society had occasioned. He regretted that during the time of the greatest difficulties he was confined to his house by illness, which prevented his doing what he otherwise would, but, by the aid of Mr. Bird, who attended to the financial duties of the Society, and also the assistance of other Members of the Council, he hoped that the interests of the Society had not materially suffered during the interregnum to which he had alluded. He had only further to mention, that after the Report of the Council had been read, he would be happy to hear any suggestions Members might have to make. That was the only opportunity the Members had in the course of the year of meeting together to express in a public manner their approval or disapproval of the way in which the business of the Society had been conducted, and he wished them to take advantage of it. It sometimes happened that a fresh eye detected defects that might not have occurred to those who had gone in the beaten track of the past year. Whatever suggestions might be made by the Members would be received by the Council in the spirit in which they would be offered, viz., for the benefit of the Institution. The Chairman then called upon

The Secretary (Mr. BREMRIDGE) to read the

REPORT OF THE COUNCIL.

FINANCIAL STATEMENT—*From January 1st to December 31st*, 1856.

RECEIPTS.	£	s.	d.
Balance in Treasurer's Hands	333	2	0
5 Life Members' Fees ... 47 5 0			
Interest ... 33 13 10			
	80	18	10
Benevolent Fund:			
Subscriptions ... 46 6 0			
Interest ... 131 3 6			
	177	9	6
Government Securities, Interest ...	173	6	10
385 Town Members' Subscriptions ... 404 5 0			
1777 Country Members... 1860 12 0			
274 Associates ... 143 17 0			
226 Apprentices... 118 13 0			
	2527	7	0
Fees:			
15 Pharmaceutical Chemists ... 94 10 0			
26 Assistants ... 128 2 0			
64 Apprentices... 144 18 0			
	367	10	0
Arrears of Subscriptions ...	97	16	6
Lecture Fees...	22	1	0
Sale of Journals ...	4	14	6
Balance of Petty Cash due to Secretary ...	2	9	10
	£3786	16	0

EXPENDITURE.	£	s.	d.
Life Members' Fund Investment...	117	13	10
Benevolent Fund:			
Investment ... 111 7 9			
Gratuities ... 26 0 0			
	137	7	9
Invested in Government Securities	300	0	0
Repayments...	0	10	6
Conversazione, Pharmaceutical Meetings, &c. ...	42	19	9
House Expenses ...	35	18	8
Rent, Rates, and Taxes...	297	15	6
Fixtures and Fittings ...	10	2	0
Apparatus ...	63	13	6
Postages ...	61	10	2
Stationery ...	13	2	3
Advertisements ...	15	7	0
Printing and Engraving ...	99	1	9
Collector's Commission...	29	11	3
Board of Examiners ...	33	12	0
Expenses of Society in Scotland ...	57	13	10
Travelling Expenses, Country Members of Council...	87	18	11
Salaries ...	300	0	0
Wages ...	169	0	0
Journals...	662	10	0
Delivery of Journals ...	181	12	3
Library ...	19	5	0
Professor of Materia Medica and Botany, including duties as Curator in his department, and payment of Assistant ...	187	10	0
Professor of Chemistry and Pharmacy, including duties as Curator in his department, and payment of Assistant ...	225	0	0
Subscription to Royal Botanical Gardens ...	21	0	0
Solicitors' Costs ...	5	12	6
Balance in Treasurer's hands...	504	16	0
" in Secretary's ditto... 107 2 1			
Less Post-office Order out of date ... 0 10 6			
	106	11	7
	£3786	16	0

We, the undersigned Auditors, have examined the accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1856:

	£	s.	d.
On account of the General Fund .....New 3 per Cents.	6345	4	8
Benevolent Fund.....3 per Cent. Consols ...	4801	1	1
Life Members' Fund, 3 per Cent. Consols ...	1325	18	7
And at that date there was due to the Life Members' Fund.....	10	10	0

GEORGE S. PEDLER,
JOHN CARR,
WILLIAM BOWER,
ADOLPHUS FREDERICK HASELDEN,
ARTHUR BOWDLER HILL,
} *Auditors.*

3rd February, 1857.

Correct—S. T. COOPER, *Accountant.*

The foregoing Statement shows an excess of income over expenditure amounting to nearly £700; £417 13*s.* 10*d.* having been invested in Government securities, and the balance in the hands of the Treasurer and Secretary being larger by £274 15*s.* 9*d.* than it was at the end of the previous year. To ensure the permanent efficiency of the Society, it is necessary that a portion of the income should be regularly added to capital to compensate for the diminution which will result from the commutation of annual subscriptions of one guinea into fees and life subscriptions amounting to fifteen guineas, the interest of which latter sum payable by future Members, being about half the amount of the subscription which is annually paid by those who joined the Society prior to the date of the Act. It is also important that a fund should be raised for the purchase or erection of a permanent freehold building, better adapted to the requirements of the Society than the present house, which is held on lease for a limited term. The Members will observe with pleasure that the legal expenses are unimportant, as the duty of enforcing the Pharmacy Act is not attended with much expense.

Although the privileges conferred by the Act have been undervalued by some persons, the Council believe that the distinction is becoming more generally understood by the public, and that the confidence founded on that distinction will be found productive of substantial advantage to those who are registered as Pharmaceutical Chemists. With a view of promoting this object, and making generally known the nature and constitution of the Society and its prospective influence on the public welfare, the Council issued towards the end of last year a statement containing a brief notice of the origin and progress of the Society, and the mode in which it is calculated to raise the qualification of dispensers of medicine. This statement, which appeared in the November number of the Transactions, was published entire, or in substance, in most of the metropolitan and many local journals, with editorial comments generally satisfactory and encouraging. The increasing attention which has of late been given to the subject of adulteration both in food and medicines, and the notoriety of occasional accidents arising from ignorance, have tended to strengthen the hands of the Society as an institution established for the express purpose of correcting these deficiencies, and depending to a great extent on public favour for its success.

The growing demand for improved pharmaceutical qualification is shown by the regular influx of students at the School of Pharmacy in London, and in some other places where facilities exist for the study of Chemistry and the allied sciences. The lectures which are provided by the Society, and to which Members, Associates, and Registered Apprentices are admitted FREE, have been better attended during the present session than they have for many years past. An increase has also taken place in the number of pupils who have entered to the course of practical instruction in the Laboratory, and it is satisfactory to observe that this class has been steadily increasing during the last three years.

Since the session 1853-4, when the number of pupils in the laboratory was only twenty-one, the numbers in the three succeeding sessions have been respectively thirty, thirty-two, and thirty-eight. The last number relates to the present session, and represents the entries up to this time. The number of candidates who have passed the several examinations of the Society since the last anniversary, is as follows:—

The Classical Examination	79	Last year	59
The Minor Examination	41	"	46
The Major Examination	27	"	15

The Council have observed with much satisfaction the favourable progress of the Society in Scotland, a report of which appeared in the last number of the Journal. It is also gratifying to find that the local associations in Liverpool and elsewhere are in a thriving state, and are assisting the efforts of the Pharmaceutical Society in promoting education.

The Pharmacopœia Committee has continued during the past year to meet regularly, and has collected some practical information with reference to the Materia Medica. The several classes of preparations are under consideration *seriatim*, with a view of suggesting such amendments as experience may show to be desirable. In the draft of a Medical Bill recently introduced into Parliament, a provision was inserted for removing the duty of compiling the Pharmacopœia from the College of Physicians, and entrusting it to the "Medical Council of Health" proposed to be constituted under the Act, an arrangement to which the Council believe no objection is entertained by the College. The change, however, would not supersede the measures now in progress for an effectual revision and amendment of the Pharmacopœia, as the duty would in all probability continue in the same hands, although nominally placed under a different jurisdiction. Under any circumstances, the practical experience of the pharmaceutist is required in completing the details of this work, and the Society having been officially in communication with the College of Physicians on the subject, cannot escape from a share of the responsibility.

It is with feelings of sincere regret that the Council refer to the serious indisposition of the late Secretary, George Walter Smith, which has deprived the Society of the valuable services of a faithful, zealous, and efficient officer. The active exertions and energy of Mr. Smith at the time the Society was founded, contributed greatly to the success of the undertaking, and his methodical habits of business, regular attention to his duties, and the identification of himself with the welfare of the Institution from its establishment until the state of his health obliged him to retire, entitle him to the esteem and gratitude of the Members. There is every reason to believe that his over-exertion and anxiety on behalf of the Society occasioned a premature breaking-up of his constitution, and the Council consider that some substantial and permanent acknowledgment is due to him for this faithful service.

Mr. Peacock moved that the Report be received, and printed in the Transactions of the Society. He congratulated the Members on the progressive state of the Society, and observed that they had only to be true to themselves, and they would become as important a Society as any in the kingdom. He regreted to find that during the past year the Chemists had been attacked by the Medical Profession more than at any other period, and the occasions selected had been at inquests on the bodies of persons who had died from poison. Before the Medical Profession cried down the Chemists for selling poisons, he thought they should define them, and that the Legislature should name what should, and what should not, be sold without a medical certificate. The Chemists wished to be friends with the Medical Profession, and it was to be regretted that the latter attacked them without cause. He took leave to quote from an old number of the *Morning Advertiser* extracts from a letter on the subject, evidently intended as a defence of Chemists and Druggists, and as a general reply to the censures of Mr. Wakley and others, in reference to various accidents which had led to coroners' inquests. Much of the matter was

quite irrelevant, and the Meeting becoming very impatient at so much time being occupied by remarks of that nature from an anonymous newspaper correspondent, and on the speaker declaiming, "I could a tale unfold,"

Mr. WAUGH rose to order. He appealed to Mr. Peacock to have some consideration for the patience of the Meeting, having had ample time to unfold his tale. (He hoped Mr. Peacock would excuse the pun.) The Meeting had for a long time listened very patiently, but really the matter which had been introduced, and the personalities respecting the Medical Profession were so entirely foreign to the purpose for which they had met, that he hoped, for the credit of the Society, that these remarks would not be reported.

The Meeting appearing to concur in Mr. Waugh's observation, Mr. Peacock brought these remarks to a close. He inquired whether the Society had a paid librarian.

The CHAIRMAN said that the duties of librarian were combined with those of other officers. There was always some person who performed the duties, but no officer under the distinct designation of librarian.

Mr. GIBBS seconded the motion.

Mr. COLLINS said that the country Chemists found the Medical Profession their best friends. They were always ready to place confidence in the integrity of the Chemists, and he was not aware that they had been so severe as Mr. Peacock had stated.

Mr. SLIPPER said that he found by conducting his business so as not to tread on the heels of the Medical Profession, he obtained their approbation as well as that of the public. He repeated his suggestion of last year, that the Report of the Council should be printed, and circulated amongst the Members previously to the day of meeting, as was done by other public institutions. It was impossible for Members, from hearing the Report read, to retain the various points it touched on so as to be able to sift and ascertain if there were anything that required particular attention, or that was objectionable. He thought it practicable in these days of steam-printing that the Report might be in the hands of Members at least one week before the day of meeting. He considered it worth the attention of Members whether it should not be a *sine quâ non* that the Apprentices of Members should become registered Apprentices in connexion with the Society. He mentioned the subject from a belief that many Pharmaceutical Chemists, especially those in the country, took Apprentices without impressing on parents the necessity of their children becoming registered Apprentices. He concurred in the necessity of their making the examination practical as well as theoretical. In some of the hospitals it was found that those students who were best up in theory were the worst operators, and so it was sometimes with Chemists.

Mr. BURDEN thought some allusion would have been made in the Report to the intention of Parliament to interfere with the sale of poisons, and he called attention to Lord Campbell's recent remarks in the House of Lords relative to the necessity of some legislative enactment to curb the free-trade in these drugs. The Chemists had no wish to poison their neighbours, but he thought great difficulty must attend such legislation as that proposed, because it was well known that persons who destroyed themselves by poison contrived to obtain it for some professed legitimate object. It would be almost impossible for Chemists to take an attestation for every pennyworth of laudanum they sold; and he considered it was desirable that the Council of the Society should watch the matter, and if necessary interfere, so as to endeavour to modify any very stringent enactment that might be proposed relative to this subject.

The CHAIRMAN said it did not follow because the Council had not noticed the subject in the Report, that therefore they had paid no attention to it. He assured the Meeting, that should any such measure as that referred to be introduced into Parliament, it would be the duty of the Council fully to consider it, and give them due notice respecting its details, and, if needful, to call a Special Meeting. He had reason to believe that some legislation was intended on the subject, and whenever the draft of the bill was submitted to Parliament, it would receive the serious attention of the Council, and be communicated to the Members.

Mr. PEACOCK rose to explain some of his previous remarks, and disclaimed any intention of attacking the Medical Profession.

Mr. COLLINS hoped it was not the intention of the Council, as the Report appeared to indicate, to go on in the same hopeless spirit as in times past. He thought, as

there were several measures before Parliament relative to the medical profession, it was a good opportunity for the Council to endeavour to obtain the introduction of a clause into them beneficial to the Pharmaceutical Chemists. Whenever legislation took place in reference to the trade, it would be necessary to include all at the time in the profession, and the sooner they commenced, he thought, the better. It would be as well to correspond with the Medical Corporations on the subject, and in the event of their consenting to support the claim of the Pharmaceutical Chemists, they in return might be able to render them assistance, by the influence they might be able to bring on various Members of Parliament. He thought the object of the Society should be first to protect its Members, and then endeavour to induce Medical Practitioners to abandon Pharmacy. He moved, "That in the opinion of this meeting the influence of the Pharmaceutical Chemists of Great Britain would be wisely exercised in supporting the claims of Medical Practitioners to a legal recognition of their right to remuneration for professional service, and that the Council be respectfully requested to take such steps as in their judgment may best promote this object. That the Council be further requested to place themselves in communication with the Medical Corporations, with the view of obtaining their concurrence to the introduction of clauses in the Medical Bill, introduced to Parliament under their auspices, prohibiting the retail sale or compounding of medicines by any other persons than qualified Apothecaries or Pharmaceutical Chemists."

The Chairman stated that, having one Resolution before the Meeting, he could not take a second, unless as an amendment.

Mr. Collins therefore deferred his motion.

Mr. Waugh, on the part of the Council, said that it was intended the Report should be printed, so that a copy of it might have been put into the hands of every Member who entered the room that morning, but owing to some mistake it had not been done. He thought that, under all the circumstances, that would be the earliest period at which the Report could be circulated.

Mr. Mason also expressed an opinion that it was desirable that the Members should have an opportunity of reading the Report before they were called upon to approve of it. He regretted the loss of their late Secretary, and he considered that his services should be recognized by a resolution of the body. They had all received the utmost courtesy and kindness at Mr. Smith's hands. He called attention to the cost of the delivery of the Journals of the Society, which he said had increased during the past five years, whilst the number of Members had decreased during that time. He at first considered the difference arose from their being sent by post, but he found on calculating it that even then the expense ought not to have exceeded £133, so that there was a difference of £50, which he could not understand. He called attention to the late delivery of the Journal. He did not get his till the second of the month, though a country friend of his received a copy on the 31st.

(It was explained that the increase in the expense of the delivery arose from the endeavour from time to time to ensure greater punctuality, that a part of the expense was formerly included in the salary of the Secretary, and that in sending the Journals by post, other expenses besides postage were incurred.)

Mr. Dickinson suggested that the Report should be published at least a month before the day of Meeting.

The Chairman said it would be impossible. It was often found that up to the day of meeting some addition or amendment was necessary.

Mr. Garle observed that, as an improvement in the examination had been alluded to, he thought it desirable that the Board should give a first and second class certificate, which is the custom of some other examining bodies.

Mr. Bottle, after urging the necessity of an early circulation of the Report, regretted that it omitted all allusion to the four medical bills now before Parliament, in one of which there was a clause affecting the privileges of Chemists and Druggists. He thought it desirable that the Report should be circulated with the voting papers. He objected to the names of Candidates for the Council being introduced into the leading articles of the Journal, and asked in what relation that publication stood to the Society—whether it belonged to the Society or to the Editor. The remarks about the Country Members of Council were quite insulting. He thought it very desirable that Country Members should be elected on the Council; and he expressed an opinion that some alteration in the management of the Society was necessary, to give new life to it. He spoke of the Members of the Medical Profession

as the best friends of the trade. The Country Chemists most suffered from the huxters, and not from medical men supplying their own medicines. He was disappointed at not hearing the opinion of the Council expressed in the Report relative to the sale of poisons. If the Council wished to continue to receive the support of the Country Members, who stood now on the list as 6 to 1, they must do something towards protecting them from the infringements of the trade by grocers, who took away the bulk of the business. The words "Pharmaceutical Chemist" might do in London, but were not a sufficient protection in the Country. He complained of the omission in the accounts of a sum for prizes to students, and he objected to the large cash balance stated in the Report to be in the hands of the Secretary.

Mr. BIRD explained that it arose from the illness of the late Secretary.

Mr. PEDLER bore testimony to the great accuracy with which the accounts of the late Secretary were kept. He urged on the Members the necessity of their being united, if they wished to obtain the advantages for which the Society was originally established. He thought there was good ground on the part of the public for being alarmed at the dispensing of poisons. The most effectual way to remove it was to raise the status of the profession.

The CHAIRMAN, in reference to the remarks on the leading article of the Journal alluded to, said that he thought Members knew that the leading articles did not form any portion of the Transactions of the Society. The reason for mentioning the gentleman's name was, that he was one of the oldest Members, and had been slighted in being passed over on former occasions. It was his opinion that the attendance of country Members two, three, or four times a year at the Council Meetings was as much as could be expected of them, and the Members should recollect that the attendance of each every time involved a considerable expense. Some of the Meetings were merely routine Meetings, and the attendance of country Members might, on those occasions, be less important. The orders of the day were invariably sent to them, so that they might attend when subjects of importance required their presence.

After a desultory conversation, in which Messrs. Macfarlane, Hollier, Moore, Hooper, Bird, Edwards, Waugh, and Woolley took part, the resolution for the reception, &c., of the Report was unanimously agreed to.

Mr. COLLINS then moved his resolution, which was seconded by Mr. DICKINSON.

It gave rise to a protracted discussion, in the course of which there appeared to be a general feeling that it was undesirable to adopt such a resolution, and that the object aimed at might be better attained by leaving it to the Council. Ultimately the resolution was withdrawn, and the following substituted and carried *nem. con.*:—

"That this Meeting is of opinion that the Council should, during the ensuing year, watch Medical Legislation, with a view to protect the interests of Pharmaceutical Chemists."

Mr. BOTTLE moved—"That the annual Report be printed, and circulated with the voting papers."

The resolution, having been seconded, was put to the Meeting, and negatived.

The CHAIRMAN stated that he had in his hand a letter from a Member who was not able to attend (Mr. Tuff, of Enfield), who desired to call the attention of the Meeting to three subjects:—1st, The unfair operation of the Patent Medicine Licence; 2nd, The sale of medicines, poisons, &c., by grocers and others; 3rd, The propriety of claiming for Pharmaceutical Chemists exemption from serving on juries, when the public health might suffer from their absence. One of these subjects had been already discussed, the others must be reserved for a future opportunity, the time having expired.

Mr. PEDLER proposed, and Mr. BOTTLE seconded, a vote of thanks to the retiring Council, which was carried.

Twelve Scrutineers having been appointed, and thanks voted to the Chairman, the Meeting adjourned until Friday, the 22nd instant, at eleven o'clock.

ADJOURNED MEETING,
22nd May, 1857.

MR. JACOB BELL IN THE CHAIR.

Mr. CONSTANCE, the Chairman of the Scrutineers, presented the following Report:

We, the Scrutineers appointed at the Sixteenth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have duly examined the voting papers committed to us, and report the following results:—

COUNCIL.

Voting Papers allowed	822
" disallowed for informality	13
	835

Ballard.. 548	Edwards 745	Morson..... 785	Squire..... 684
Bird 737	Herring 442	Moore..... 521	Smeeton 482
Bucklee..... 729	Lea 446	Meggeson 677	Sandford 624
Davenport ... 725	Macfarlane ... 768	Peacock 536	Woolley..... 681
Deane 781			

AUDITORS.

Voting Papers allowed	785
" disallowed for informality	33
	818

Barnes..... 399	Carr 600	Hill 636	Pedler 601
Bower 515	Haselden..... 664	Palmer..... 432	

(Signed) EDWARD CONSTANCE, *Chairman* JOSEPH KETTLE
W. K. HOPKIN JOHN BARNARD
WILLIAM WINDLE CHARLES COLES
JOHN T. FENN W. H. BELL
NATHANIEL B. GIBBS GEORGE GALLIERS
THOMAS WILLIAMS JOHN T. TUPHOLME

The CHAIRMAN declared the COUNCIL and AUDITORS for the ensuing twelve months to consist of the following Members:—

COUNCIL.

BALLARD, EDWIN, Farringdon, Berks
BELL, JACOB, 338, Oxford Street
BIRD, WILLIAM LIONEL, 42, Castle Street, Oxford Street
BREW, THOMAS A., 71, East Street, Brighton
BUCKLEE, WILLIAM HENRY, 86, New Bond Street
DAVENPORT, JOHN THISTLEWOOD, 33, Great Russell St., Bloomsbury
DEANE, HENRY, Clapham
EDWARDS, JOHN B., 42, Berry Street, Liverpool
EDWARDS, GEORGE, Dartford
HANBURY, DANIEL BELL, Plough Court, Lombard Street
KEELING, GEORGE R., High Street, Epsom
MACFARLANE, JOHN F., 17, North Bridge, Edinburgh
MORSON, THOMAS N. R., 19, Southampton Row
MEGGESON, GEORGE, 64, Cannon Street, City
MOORE, JAMES LODGE, Craven Place, Paddington
PEACOCK, HAMERTON R., 170, High Street, Poplar
SANDFORD, GEORGE WEBB, 47, Piccadilly
SMITH, NATHANIEL, High Street, Cheltenham
SQUIRE, PETER, 277, Oxford Street
WAUGH, GEORGE, 177, Regent Street
WOOLLEY, JAMES, 69, Market Street, Manchester

AUDITORS.

BOWER, WILLIAM, 96, Tottenham Court Road
CARR, JOHN, 171, High Holborn
HASELDEN, ADOLPHUS F., 18, Conduit Street
HILL, ARTHUR, 11, Little Britain
PEDLER, GEORGE S., 199, Fleet Street

In answer to a question respecting the informalities referred to in the rejected votes, the Scrutineers stated that in some voting papers more than the proper number of names were left. Some of the Country Members had omitted to identify the envelope with name and address, as required by the bye-laws, and the votes of some London Members having been sent by post, could not be received.

The CHAIRMAN stated that, since the meeting on Wednesday, the substance of a

proposed Bill for regulating the sale of poisons had been published, and copies of the Bill would in the course of the day be sent to the Members of the Council. It was obviously impossible that such a Bill should pass, and it would be necessary for the Council to watch its progress.

The two Medical Bills were on the table, but the Chairman thought it needless at the present time to trouble the Members with any detailed remarks on the subject. The two Bills would tend to militate against each other, but neither of them appeared materially to affect the interests of Pharmaceutical Chemists.

Mr. Bucklee moved, and Mr. Bird seconded, a vote of thanks to the Scrutineers, which, having been carried unanimously, was acknowledged by Mr. Constance.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, May 13th*, 1857.

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Donations of plants were announced from Mr. Ereaut, of Jersey, Mr. Medley, of Worcester, and Mr. Groves, of Weymouth.

An account of a botanical excursion to Lulworth, near Weymouth, by Mr. H. Groves, was then read, and illustrated by specimens.

The Committee have arranged that the botanical excursion shall take place on Saturday, the 27th of June. They propose that the Members should assemble at the Waterloo station and proceed by rail to Putney, from which place they would go across Wimbledon Common to Richmond. Any one wishing to join the excursion should communicate with the Secretary, Mr. C. Wood, 17, Bloomsbury Square.

As some of the Members wish to dine at Richmond, any Member desirous of joining the dinner should indicate the same to the Secretary before the 20th of June.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 23rd April, 1857.

MR. ABRAHAM, THE PRESIDENT, IN THE CHAIR.

Mr. B. Townson was elected a Member, and Mr. Booker an Associate of the Society.

The Secretary announced donations to the Library and Museum from Messrs. W. J. Blackburn, J. H. and S. Johnson, J. F. Grimsdale, A. Redford, T. D. Walker, H. S. Evans, J. Southward, the Royal Institution, and himself.

The Chairman then intimated that the next business was that which was announced in the circular:—

A REPORT ON THE GENERAL PROPERTIES OF THE RIVINGTON WATER.

BY J. B. NEVINS, M.D., AND J. B. EDWARDS, PH.D.

This was a subject of great interest, and immediate practical importance. It was one on which they ought to be able to afford useful information to their fellow-townsmen. It had been before discussed amongst them, and no doubt it would be again discussed with that philosophic calmness which distinguished their former debate. It had excited strong expressions; but he hoped on this occasion nothing that could give rise to unpleasant feeling would be indulged in, and that they should proceed, and be actuated by a love of truth. The two gentlemen who had prepared the report had paid very great attention to the subject; they had studied it laboriously, and no doubt would be able to give a good reason for all they stated.

Dr. Edwards then proceeded to read the report of the evening, an elaborate and lengthy document. He said that on the 15th of January last Mr. Mercer brought before the Members of the Chemists' Association specimens of the Rivington water, in small quantity, obtained by Mr. Alderman Bennett, and gave the result of a general chemical examination of the water, dwelling specially upon its action as a solvent upon metallic lead, and on the decomposition which he anticipated would

result from long storing on sea voyages, in consequence of the organic matter. These statements, and the comments made upon them, caused much anxiety in the public mind as to the wholesomeness of the supply which the subsequent pro-Pike and anti-Pike discussions by no means tended to allay. A proposal was therefore made to submit the water to certain eminent chemists in different localities, for scientific examination and report; but the expense of bringing such judges to the spot, and of employing them upon a long and elaborate inquiry, negatived the proposition. It then occurred to himself and Dr. Nevins that it became a public duty to come forward, and do to the best of their ability what was necessary to relieve the public mind on this subject, trusting that their offices would be accepted in good faith, their only desire being to serve the public. Acting, therefore, under a sense of this responsibility, they had endeavoured to steer clear from party bias, and to entertain this as a purely scientific question.

1st. Is the Rivington water in a condition fit for human consumption?

2ndly. If not, can it by any available means be made pure and wholesome?

Having obtained water from the various reservoirs at Rivington, from Prescot, and well-water from Green Lane, the authors proceeded to make their experiments. The quantity of water operated upon had been about twenty gallons, and had included, on several points, the present town supply, as well as various admixtures of the well-water with the Rivington in very various proportions. Having repeated the results of the experiments upon lead, as read before the Literary and Philosophical Society, Dr. Edwards went on to observe that the next experiments were made with a view to ascertain the keeping qualities of the water, and then noticed the colouring matter found in the Pike water. He said that publicity had recently been given in the Liverpool papers to experiments in the direction of galvanic action with a view to removing the colour, by Dr. Medlock, of London, and the results obtained by that gentleman had been adduced as applicable to the decolorization of the Rivington water. The process consisted simply of suspending a coil of iron wire in a reservoir of the Thames water. But surely it would be remembered that the Rivington water was in contact with iron by its line of pipes for twenty-five miles; and if so simple an agent was to decolorize it, we should already obtain it in this condition in the present reservoir. The organic matter in Thames water, it must be remembered, is largely of animal origin, hence the compound of nitrogen, viz., ammonia and nitrous acid which result from its decomposition. In the present instance the organic matter is purely vegetable in its origin; the theory and practice of Dr. Medlock did not, therefore, apply. Decolorization by means of animal charcoal was objected to on the ground of expense; but the reburning of animal charcoal by simple apparatus was now so readily applied, and so generally used, that the expense would not be large after the first outlay, while the character of the water would be greatly improved. It had lately been observed of the town supply of water that it was much harder than when the Rivington supply was first introduced, and that it now possessed neither the advantages of the well-water nor those qualities peculiar to the Rivington water. The authors had observed this change, and attributed it to an ineffectual attempt to decolorize the water by means of quicklime, which, while only partially successful in removing the colouring matter, materially increased the hardness of the water, and for many purposes injured its character. The authors entertained little doubt that, if experiments were instituted upon a sufficiently large scale, the colour might be effectually removed, without in the slightest degree injuring the best quality of water, namely, its softness. The authors concluded their paper thus:—The general conclusions to which we have arrived, as a result of these experiments, may be thus briefly stated.

1st. That the Rivington water, or any mixture containing it in equal proportions or thereabouts, will, when stored for twenty-four hours in a leaden cistern or tank, dissolve lead. Water thus impregnated is dangerous to the public health; and it is therefore necessary that, whenever leaden cisterns are employed, the metal should be protected by paint or some suitable cement. No danger results from the mere passage of the water through short lengths of leaden pipes.

2nd. That the Rivington water contains less germinating matter than the well-water from Green Lane, and when stored in either close or open vessels has preserved its sweetness during the six weeks over which our experiments have extended. Mixtures of Green Lane and Rivington water do not remain sweet for a lengthened period.

3rd. That the colouring matter may be, and ought to be, removed; and that, when thus properly filtered, the Rivington water is a wholesome and very excellent beverage, and calculated to be a great boon to the community.

4th. That the small amount of mineral ingredients it contains are of the most valuable character for dietetic and manufacturing purposes; and that the objectionable colour being removed, it has properties superior to well-water. Its insipidity is but the result of its purity and of the small proportion of carbonic acid which it contains. While, then, as a matter of taste and luxury, it may be desirable to retain a limited supply of well-water for the benefit of those who prefer it, the general public will be best served by a speedy and abundant supply from Rivington, free from any admixture whatever; and the question of a separate supply should be ascertained as one of public convenience rather than as one affecting the public health.

Dr. NEVINS stated that he had had considerable correspondence with medical men in those districts supplied with water of a similar description to that from Rivington. The towns to which he referred were Kendal, Lancaster, Bolton, and Sheffield. In Kendal, the report was, that for about two months, during the heat of summer, the water was so offensive that the people had to resort to the wells; but that the health of the town had improved since the supply of surface water, and that cases of lead poison were unknown. The reports which he had received from the other three towns were very similar; and so far as England was concerned, in regard to the effect on the health of the people, the answer was decidedly favourable.

The reading of the paper and Dr. Nevins's remarks were followed by considerable discussion, in which the Chairman, Mr. Mercer, Alderman Bennett, Dr. Collins, Mr. Mackinlay, and others, joined.

Thursday, 7th May, 1857.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. JOHN GLOVER, of Birkenhead, was elected a member.

The SECRETARY announced donations to the library from Mr. W. Wright and Mr. W. H. Samuel.

The CHAIRMAN called attention to a letter of Dr. Medlock, referring to the paper read by Drs. Edwards and Nevins at the last meeting.

Dr. EDWARDS said, that the question at issue was, could the colouring matter in the Rivington water be removed by means of iron? He had found that iron had some effect in destroying the vitality of the vegetable matter in the Rivington water, but does not remove it from solution, because, when heated, the water became more highly coloured than before, in consequence of the decomposition of the organic matter present.

Mr. G. R. BERRY then read the following paper:—

DRY COLLODION PROCESSES.

In the investigation of the dry collodion processes I propose to glance, first at the ordinary wet process, its manipulations and the chemical changes involved, and then to detail the different methods by which various experimenters have endeavoured to produce a dry collodion process, and at the outset I would mention that the more the whole subject of photography is investigated, the more palpable is the evidence that the ordinary laws of chemistry are capable of explaining all the phenomena observed in the different photographic processes, albeit our new science has revealed to us subtile chemical changes which our ordinary tests have failed to appreciate, illustrations of which will arise in the course of our subject this evening.

We will take first the ordinary collodion process, which is thus divided:

1. Preparation of the collodion.
2. Preparation of the nitrate of silver bath.
3. Preparation of the developing solution—positive and negative.
4. Removal of the surplus chemicals.
5. Varnishing.

Collodion is, as all are aware, a solution of one of the pyroxyline compounds, in a mixture of alcohol and ether, and holding also in solution an iodide, or a mixture of iodide and bromide of potassium, ammonium, cadmium, or other bases. The number

of these is not very extensive, as the case will admit only those soluble in the menstruum before mentioned, but if the ingredients are few in number the variations in quantity and relative adjustment are almost infinite, as every photographer has his series of pet fancies, and to this fact nearly all the disheartening failures of amateurs are attributable, and almost every instance of success has been attained by those who, adopting one formula, have adjusted their silver bath and developer in accordance; and, therefore, when the impressions fail to be successful, have only these three items to examine or replace. The silver bath varies in its strength from 20 to 60 grains per oz. of water, and it is on the proper reaction between the collodionized plate and the nitrate of silver in solution all success depends. The most approved formula for the silver bath for the negative and dry processes I believe to be the following:—

Nitrate of silver, that has been fused and probably containing a portion of nitrite . . . . . 1oz.

Dissolve in 4oz. water, to which must be added iodide of potassium . . 20grs.

This mixture must be well agitated at intervals for one hour. By this means the strong solution of nitrate of silver dissolves a portion of the precipitated iodide, and lets fall another portion on the addition of water to make up 14 fluid oz. The solution is then filtered and is ready for use. The collodion plates used will present an even primrose-coloured surface, without *striæ* or other markings, and the developed impressions will be clear and free from any irregularity of coating. The collodion process negative has, in itself, many advantages. Its great advantage is—exquisite sensibility, inasmuch as under favourable circumstances instantaneous impressions may be obtained; at the same time the delicacy of definition is all that can be desired, and if not equal to albumen, it is the fault in the preparation of the pyroxyline from which the collodion is made. It is facile in manipulation and speedy in its perfected results. Its disadvantage is the necessity of obtaining the impressions in the camera in the first few minutes from the excitation of the plate; it is therefore impossible to work far away from the dark closet or the tent in which the plates are prepared and developed. It is this that has prompted experimenters to devise some plan by which the sensitiveness of the plate might be indefinitely prolonged, and I lay before you the various plans proposed, in the order of their publication, as correctly as my means will allow.

If we excite a collodion plate in the usual way, and leave it in the dark slide until dry, we shall find that the nitrate of silver film, as it concentrates by evaporation, dissolves out the iodide from the collodion surface, and eventually crystallizes in minute stellar groups, completely destroying the utility of the surface as a photographic medium. The prevention of this result was the first problem to be solved if the plates were to be preserved any length of time after preparation. At first various plans were tried to prevent the evaporation altogether, as, for instance, laying a second glass plate directly upon the collodionized surface. Thus Messrs. Spiller and Crooks attempted the same object by steeping the prepared plate in a strong solution of a deliquescent nitrate. At first zinc, and subsequently magnesia, were employed. At a later period, Messrs. Shadbolt and Lyte partially washed off the excess of nitrate of silver from the plate, and poured over it a solution of honey, and I do not think there is, even now, a better process extant.

Simple oxymel, glycerine, treacle, and various other substances have also been employed. During this period the somewhat remarkable process of M. Taupenot was published, and was as follows:—The plate was first coated with collodion and sensitized in the usual way, the surface washed, and a mixture of albumen and honey slightly iodized was poured over it; it was then allowed to dry, and again plunged into the silver bath and rinsed, when it might be used, either wet or dry. The theory of the process, at the time it came out, was imperfectly understood; and, as it involved very operose manipulations, it was not so generally used as it deserved. The main point was the coating the excited collodion surface with the albumen, thus filling its pores and preserving it in some measure from the action of the air; and it being ascertained that even if the whole of the free nitrate were removed by washing, and the plate dried in the dark chamber, it was yet sensitive, although in an inferior degree than when recently prepared.

Mr. Barnes, who has been eminently successful upon dry plates, has published a pamphlet on the subject; contemporaneously, Dr. Hill Norris proposed to cover the washed plates with gelatine, and I believe his dried plates preserve their sensibility

for many months. I may add that Dr. Norris has patented his process, and that a company has been formed at Birmingham to sell the prepared plates.

Mr. Sparling employed a solution of dextrine mixed with honey, and iodized in the same way as Taupenot, also following him in two immersions in the silver bath.

Mr. Maxwell Lyte has yet more recently advocated the use of what he terms *meta-gelatine*, produced by boiling a solution of gelatine with sulphuric acid until it ceases to gelatinise on cooling, then removing the acid by digestion upon carbonate of lime, filtering, and adding a portion of clarified honey. This is poured over the plate, without previously washing, and stored away until required for use. This is certainly the quickest, and, as far as I have seen it tried, the most satisfactory process, as it may be used indifferently, either wet or dry.

One word more on the peculiarities of the meta-gelatine. While the Taupenot, Norris, and Sparling plates are hard and horny, the meta-gelatine is as it were porous, and to this I attribute the fact of the non-necessity of washing away the free nitrate, and from a series of experiments I have now in progress, I think I may safely say that before long I shall, by a modification, be enabled to dispense with the collodion altogether, and at the same time preserve the rapidity of action. This would, with large-sized plates, be a great pecuniary boon to photographers, as well as obviating the uncertain way in which collodion sets on large surfaces. Of course it is not to be expected that I shall divulge my mode of procedure until I have achieved my object.

The thanks of the meeting were unanimously awarded to Mr. Berry for his valuable paper.

ORIGINAL AND EXTRACTED ARTICLES.

HYDRIDE OF AMYLE.

BY T. AND H. SMITH, EDINBURGH.

In presenting a specimen of the new anæsthetic discovered by Professor Simpson, the hydride of amyle, and which we had the pleasure of preparing for him, it may not be out of place to make a few remarks regarding its history, chemical characters, and physical properties.

Dr. Frankland, Professor of Chemistry, Owen's College, Manchester, discovered it in the course of an investigation undertaken for another object. It had long been disputed whether ether and alcohol were mere hydrates of olefiant gas,

Olef. gas.	Water.	Ether.
$(C_4 H_4)$	$+ HO =$	$(C_4 H_5 O)$
		Alcohol.
$(C_4 H_4)$	$+ {}_2HO =$	$(C_4 H_6 O_2)$

or whether they were constituted by the union of a compound radical ethyle ($C_4 H_5$) with oxygen ($C_4 H_5 + O = (C_4 H_5 O)$ in the case of ether; alcohol being merely its hydrate ($C_4 H_5 O + HO = (C_4 H_6 O_2)$).

This last view had been advocated strongly by Liebig, although the very existence of organic radicals remained at that time entirely hypothetical; yet Liebig expressed his conviction that the ethyle radical ($C_4 H_5$) would be obtained in a separate state.

Dr. Frankland, in entering on the interesting and able investigation of which the hydride of amyle was one of the fruits, was influenced by the desire of deciding this question by separating the radicals themselves, and more especially those of the different alcohols and their derivative ethers. The subject was undoubtedly a most difficult one, and required a clear head, profound chemical knowledge, and nice accuracy of manipulation.

Dr. Frankland began with wine alcohol, and unquestionably separated the radical ($C_4 H_5$) ethyle, but which existed as a vapour even below the zero of F. He concluded, from the much higher equivalent of amylic alcohol ($C_{10} H_{12} O_2$) and the higher density of its vapour, that the radical amyle, if he should succeed in obtaining it, would exist as a liquid at ordinary temperatures, and thus give the means of ascertaining its nature more certainly, and also give a clue to a correct understanding of the character and functions of the compound radicals in general, and more especially of those which exist in the class of bodies called alcohols, on account of the great theoretical and practical interest belonging to them in a chemical point of view.

The method by which Dr. Frankland obtained and proved the existence of amyle, the radical of amylic alcohol, was to heat for several hours in an oil-bath iodide of amyle prepared from pure fusel oil by the simultaneous action of phosphorus and iodine on it,* in sealed glass tubes along with granulated zinc at a heat of 190° C. (374° F.), and then distilling off the products of decomposition. The first two-thirds came off at a heat of about 80° C., and the remaining third at about 160° C. (320° F.). The first distillate on rectification proved to be a liquid boiling at about 55° C. (95° F.), and on acting upon the liquid with anhydrous sulphuric acid, he separated a carbo-hydrogen polymeric with olefiant gas (C_{10} H_{10}), and on then distilling the part unacted on by the acid, he obtained a liquid having the composition (C_{10} H_{12}), with the very low boiling point of 30° C. or 86° F., which, in place of having an unpleasant odour and tar-like taste as the mixture had, possessed, on the contrary, a grateful fruity odour, and was tasteless.

This was the hydride of amyle, whose decided and energetic anæsthetic action Dr. Simpson has just discovered.

It is a clear colourless mobile liquid, and is the lightest fluid known, having the very low density of .638 at 57° F., and a vapour density of 2.5. It is very inflammable, and burns with a brilliant white and smokeless flame. It is insoluble in water, but readily soluble in alcohol and ether. It is a very stable compound, resisting the action of fuming sulphuric acid and the most powerful oxydising agents. Its rational formula is (C_{10} H_{11} + H), and therefore the hydride or hydruret of the radical amyle.

The liquid that was distilled last from the tube at a high heat proved to be the pure radical, and which had now been got in a separate form for the first time. This liquid is colourless and clear, of a density of .770, and boils at 155° C., or 311° F., and the density of its vapour is 4.9.

As Dr. Frankland found in his previous investigations for the discovery of the radical of wine alcohol, that on exposing the iodide of ethyle with an equal bulk of water along with zinc in sealed tubes to the action of heat, the only product was the hydride of ethyle, he was led to try the same process with the iodide of amyle, and the result of the use of water in the reaction was exactly analogous. Instead of a mixture of amylene, amyle and its hydride, he now obtained as the only product of decomposition the hydride of amyle, which distilled off at a very low heat, and after digesting the liquid for twenty-four hours with caustic potash, and redistilling at 35° C., or 95° F., was obtained quite pure.

He also found, that by the addition of water to the iodide and zinc, the decomposition easily took place at a heat of 140° C., or 285° F., whilst with the iodide and zinc alone a heat of 190° C. was required, besides the necessity of amalgamating the zinc.

On proceeding to prepare the hydride for Dr. Simpson, we very soon discovered the unsuitableness of sealed tubes, as used by Dr. Frankland, for its preparation in sufficient quantity to test its powers as an anæsthetic. We therefore got much larger tubes made, and carefully annealed, of one inch internal diameter, and $\frac{3}{16}$ of an inch thick; and instead of being sealed, which necessarily involved their destruction at each operation, we had them effectually closed by accurately ground stoppers, and these again strongly fixed down in their places by a metal bridle, with a binding screw. But from the enormous pressure, not less than 300 lbs., or twenty atmospheres, by calculation, to the inch, there was extreme difficulty in getting the stoppers perfectly tight. Seeing, however, superior advantages in this plan over the other, if the stopper could be made tight, we were induced to persevere, and at length, with great care in the grinding, succeeded in making an absolutely tight tube, even under such great pressure.

But from the great risk of explosion with such size tubes, we afterwards gave up the idea of glass ones altogether. One of these, after being exposed to the usual heat with a charge for more than an hour, burst into innumerable fragments with a tremendous explosion, breaking the thermometer and blowing out the sides of the

* The iodide of amyle is a colourless, transparent, heavy liquid; density 1.5. It is not readily decomposed, not changing colour even when kept for a long time in diffused daylight, although the direct rays of the sun decompose it easily. It mixes readily in all proportions with oils and ointments. In consequence of this, and the large quantity of iodine—two-thirds of its weight—which it holds in a perfect state of solution, it seems to us to be worthy of attention as an outward application, and all the more that the iodine is in the most favourable condition for being absorbed.

bath, whose scalding contents were scattered about in all directions, but fortunately without doing any personal injury. This occurrence proved the necessity of adopting another plan, and we therefore thought of a copper tube, which idea, however, was nearly put aside, under the fear of a strong galvanic action being induced, and interfering with the desired action; but, on reflection, such a result seemed to be of a favourable nature rather than otherwise, and we have now found that a copper tube answers admirably—and, in fact, part of what we made for Dr. Simpson was prepared in one.

A key to the explanation of the formation of the hydride of amyle is found in the tendency of the radical amyle to combine, not only with electro-negative, but also with electro-positive elements. Thus there are not only compounds like the following:—

Amyle.		Electro-negative elements.
$(C_{10} H_{11})$	+	O
$(C_{10} H_{11})$	+	Cl
$(C_{10} H_{11})$	+	Br
$(C_{10} H_{11})$	+	I;

but also—

		Electro-positive elements.
$(C_{10} H_{11})$	+	Z
$(C_{10} H_{11})$	+	H

Dr. Frankland succeeded in preparing both zinc methyle, zinc ethyle, and zinc amyle. These have all an intense attraction for oxygen. In the case of zinc methyle, it equals potassium in that respect; a small glass tube, containing only a few drops of the liquid zinc methyle, actually became red-hot on being placed under water, from the great intensity of the chemical action. The zinc ethyle is a liquid of 1.18 density, boiling at 118° C. or 244° F., and having a vapour density of 4.25.

All these metallo-organic bodies have such an attraction for oxygen that the most extraordinary precautions are necessary in preparing and distilling them, both to get quit of every trace of water, and to exclude the presence of air by replacing it either with an atmosphere of hydrogen, nitrogen, or carbonic acid.

The moment one of these metallo-organic compounds comes in contact with moisture, it is decomposed: the zinc takes the oxygen and the radical the hydrogen from an equivalent of water.

One of the methods of analysing it is indeed founded on this character: thus in the case of the amyle compound the action is as follows:—

$$\left.\begin{matrix}(C_{10} H_{11}) + Z \\ H\ O\end{matrix}\right\} = \left\{\begin{matrix}C_{10} H_{11} + H \\ Z\ O\end{matrix}\right.$$

And the production of hydride of amyle appears to be as here represented:—

$$\left.\begin{matrix}(C_{10} H_{11}) + I \\ H\ O \\ Z\ Z\end{matrix}\right\} = \left\{\begin{matrix}(C_{10} H_{11}) + H \\ Z\ I + Z\ O\end{matrix}\right.$$

Consequently, in distilling after the compulsive action of heat and great pressure, the hydride comes over, and there remains in the digester an oxyiodide of zinc.

In preparing the hydride of amyle the first step necessary is the purification of the crude fusel oil, which is a mixture of propylic ($C_6 H_8 O_2$), butylic ($C_8 H_{10} O_2$), and amylic alcohols ($C_{10} H_{12} O_2$), and of other alcohols much higher in the series; so that the boiling point, as we found, rises much higher than even 400° F. before the distillation comes to a close. As the boiling point rises from that of propylic alcohol (203° F.) to that of amylic alcohol (269° F.), it can hardly be doubted that the hydrides of the corresponding radicals would vary in their boiling points in at least an equal degree; and as the hydride of amyle has a boiling point of 86° F., there can be little question that the boiling points of the others lower in the series would be so low, that at ordinary temperatures they would exist only as vapours. Dr. Frankland accordingly found that the hydride of ethyle ($C_4 H_5$+H) still remained gaseous, even when submitted to twenty atmospheres of pressure.

A question here suggests itself to the mind: may not these hydrides, existing only in vapour at ordinary temperatures, be anæsthetics themselves, and if so, may their use as such be not an altogether impractical idea?*

* For instance, may not their saturated solution in alcohol, in which they are readily soluble, give a ready method of obtaining their use as anæsthetics?

From what is known of the volatile liquids got from wood and coal tars and bituminous minerals, these naturally suggest themselves as cheap and ready sources of the hydride of amyle, but from these it does not appear to us that it could be obtained in a sufficient state of purity as an anæsthetic, even though it may be found to form one of their ingredients.

Moreover, the difficulty of separating it from other ingredients, either by fractional distillation or otherwise, would be so great that success would be obtained at too costly a rate; and, after all, we fear the hydride of amyle would hardly fail to repel by the taint attaching to it from such sources.

With a view of getting quit of the expense of the iodine, which, however, can be recovered, we thought of trying the chloride in place of the iodide of amyle, but completely failed in getting the hydride from it, although the digester was subjected to the same heat as the iodide, and for double the time. On removing the preserve from the plug, after proper cooling, an escape of gas took place with a loud report, showing the presence of an uncondensable gas, most probably hydrogen; and on subjecting the contents to distillation, nothing came over till the heat reached the boiling point of the chloride, when nearly the whole of it distilled: besides, the zinc, instead of being matted together, as in the case of the iodide, by the formation of oxyiodide of zinc, was found in the tube quite loose.

In making the iodide of amyle, when the fusel oil has been nearly saturated with iodine, a solid crystalline matter separates, which becomes more abundant on the cooling of the liquid. So far as we have examined the compound, it seems to be a subiodide of phosphorus. It fumes strongly on exposure to the air, and on throwing it, after being firmly pressed in blotting paper into a glass tube containing water, a hissing like red-hot iron in water is produced, and on applying a light to the escaping gas, it takes fire and burns with a brilliant phosphorus flame, and gives abundant white fumes of phosphoric acid, and leaves a red crust of suboxide of phosphorus (?) on the mouth of the tube. The gas appears to be phosphuretted hydrogen. The water on examination was found to contain hydriodic and phosphoric acids. Heated in a test tube it melts at a low heat and boils, giving a sublimate, which condenses in crystals nearly colourless on the sides of the tube. On applying a light to it in the open air it takes fire, burning with a weak flame and the production of a violet coloured smoke. Further investigation into its nature has meanwhile been prevented by falling short of material.

REPORT OF THE

RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,

AND OF THE

APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D.

(*Continued from p.* 570.)

Extraction of Potash from Felspar and similar Minerals.—Prof. Fuchs observed some years since that when an intimate mixture of felspar and lime is ignited, the potash may be dissolved out of the mass by water, but it is necessary in this case to continue the washing for some time. Dr. Meyer,* of Berlin, has recently adopted the same means of rendering the potash soluble, and finds that its extraction is facilitated by digesting the ignited mass with water under a pressure of seven or eight atmospheres. After a short time the liquid becomes so alkaline that it does not contain any lime in solution. By this means he has extracted from felspar containing 13.56 per cent. potash and 0.36 soda, from 9 to 11 per cent. of alkali. He recommends using lime in the proportion of from 14 to 19 equivalents for one of felspar—or for 100 parts of felspar, 139 or 188 parts by weight of lime. Assuming that the alumina acts as an acid, there would be in such a mixture 3 or 4 equivalents of base to one of acid.

The lime may be used in the state either of hydrate or carbonate; it must be intimately mixed with the felspar, the mass rolled into balls three or four inches in diameter, gradually dried, and then kept at a bright red heat for several hours.

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* *Polytech. Journ.*, cxliii., 276.

When the burning has been properly conducted, the mass does not contain either carbonate of lime or caustic lime, and does not become hot with water. After burning, the mass is powdered and treated with water for two or four hours. A second treatment with water is not worth while. The felspar should be ignited and thrown into cold water in order to facilitate the powdering.

The insoluble residue is applicable for the preparation of a very superior kind of Portland cement, for when ignited again it hardens under water very rapidly.

Other minerals besides felspar may be used for this purpose; for instance, many kinds of granite containing 7 per cent. of potash.

Preparation of Iodide of Potassium.—The usual method of preparing iodide of potassium by precipitating periodide of iron with caustic or carbonated alkali, is open to several objections. Prof. Liebig* suggests, as an improvement on the method of preparing iodide of potassium, to dissolve one-third of the iodine in caustic alkali, and to precipitate the iodide of iron with this solution, so as not to introduce an excess of alkali. The pasty precipitate does not appear very uniform at first, but when the mixture is left at rest for some hours and shaken at intervals, a perfect combination of protoxide and peroxide takes place, and the whole of the iodide of potassium may be washed out readily.

Ferruginous Cement.—M. Chenot† prepares cement by mixing together clay or gypsum with spongy iron, obtained by reducing iron ore with hydrogen. Under the oxidizing influence of the atmosphere, the iron is converted into oxide, which is considerably more bulky than the metal, and consequently this change causes a considerable hardening of the cement. Addition of water, urine, ammonia, or vinegar accelerates the hardening very much.

Application of Town Refuse and Sewage for Agricultural Purposes.—Mr. Campbell brought this subject before the Fellows of the Chemical Society at a recent meeting. As the general question of sewage disposition is now being considered by a committee appointed for the purpose, Mr. Campbell confined himself to the consideration of those chemical facts which had a direct bearing upon the applicability of excremental material and town sewage as manure.

From a comparison of the results obtained by various observers, Mr. Lawes and Dr. Gilbert have computed that the quantity of fecal and urinary excretions voided daily by a single individual contains on the average 2 ounces of dry substance. Of this, one-fifth may be taken as equivalent to ammonia, another fifth as mineral substance, and the remaining three-fifths as organic substance. The agricultural value of excremental material is therefore to be sought in the two-fifths of dry solid, representing ammonia and mineral substances.

According to the "Analyses of the Ash of Feces and of Urine," published by Mr. Way in the Journal of the Royal Agricultural Society, the average quantity of phosphoric acid excreted daily by each individual is 30·4 grains.

The quantity of potash calculated from the same analyses amounts to 21·7 grains daily for each individual.

For a population of 10,000, therefore, the quantity of dry solid in the excrement yearly will amount to 205 tons, which would have a money value of £3075 sterling. This estimate is made upon the assumption that the ammonia in excremental material is worth £70 per ton; the phosphoric acid £56 per ton; and the potash £70 per ton.

The amount of these three substances was particularly referred to, because there is no question as to their agricultural value, provided they are to be procured in a condition available for the food of plants.

In the case of excremental material this circumstance seriously affects its value as manure. Thus, for instance, the quantity of water in fresh feces amounts, according to the analyses of Berzelius and others, to upwards of 70 per cent., while that in urine amounts to 93 per cent.

The value of solid and liquid excrement as manure has not only been pointed out by various chemists, but has long been recognized by agriculturists, for they had long been in use, both in this country and on the Continent, though without any attempt to manufacture them into a more portable and less objectionable form than they are

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* *Annalen der Chemie und Pharmacie*, c., 339.
† *Journ. de Pharm.*, Jan., 1857.

delivered by nature, until early in this century, when, in 1802, a M. Estienne proposed to gather the excrements into tanks, to allow the liquid part to run off, and to dry the residue in the sun, either alone or mixed with lime.

When this dry mass was stowed into sheds in heaps its temperature rose to 212 deg. Fah.; afterwards it was crushed into a powder, which is stated to have been devoid of all smell, and not very bulky. A few years afterwards Sir Humphrey Davy, in a lecture delivered to the Board of Agriculture, mentioned especially mixing quicklime with nightsoil, to deprive it of its disagreeable smell, and observed at the same time that the Chinese, whom he considered to possess more practical knowledge of the use and application of manures than any other nation, are in the habit of mixing their nightsoil with one-third of its weight of fat marl, make it into cakes, and dry it by exposure to the sun. "These cakes," Sir Humphrey adds, "we are informed by the French missionaries, have no disagreeable smell, and form a common article of commerce of the empire."

After these suggestions on disinfecting nightsoil, and depriving it of odour, no further progress appears to have been made until as late as 1835, when M. Pottevin noticed the value of carbon, as an adjunct to marl, for disinfecting substances, and obtained a patent for the preparation of a powder containing charcoal for this purpose.

After M. Estienne and M. Pottevin follow a number of other inventors, with methods which exhibit a more or less striking ignorance or disregard of the true principles of manuring, and of the real value of manure. Many of these methods, although patented, are identical; others are evidently useless for the purpose of producing manure of any agricultural value. Those which are most feasible consist in mixing with the excrement some absorbent substance, such as lime or charcoal; but as the value of manure depends upon the relation between the mass and the amount of particular constituents, the advantage of this plan cannot be great, because these substances have not such agricultural value as will admit of their transport to any great distance, and because the solid excrement to which they might be applied most efficaciously, as far as the production of a dry portable mass is concerned, is very much less valuable as manure than urine, and this would require such a large amount of lime or charcoal for that purpose as to be seriously reduced in value.

This constitutes the chief obstacle to the profitable use of excrement for agricultural purposes; for, although the gross amount of valuable substances contained in the excrement of even a small population may be very considerable, the separation of the large amount of water would be too costly to admit of being practically carried out, and the admixture of absorbent substances would decrease the value per ton, while it augmented the cost of transport.

Mr. Bridges Adams has, in a recent number of the *Engineer*, discussed the possibility of dealing with the excrement of the population of London without allowing it to pass into the sewers. He considers that if, by a mechanical arrangement of water-closets, the fæces and urine are collected apart, the latter may be barrelled up and very profitably transported by rail to agricultural districts.

He estimates the annual quantity of urine at 24,428 tons, but since urine contains 97 per cent. of water, and only 1 per cent. phosphoric acid and nitrogenous substance, equivalent to only 0.7 per cent. ammonia, it would be necessary to use about 30 tons, for the purpose of applying half a cwt. of ammonia to an acre. The cost of carriage for this quantity 20 miles beyond London would be about £2, whereas half a cwt. of ammonia can be bought for much less than £2, either as sulphate of ammonia or guano, and the cost of application to the land would be very considerably less than that of urine.

To dispose of the fæces, Mr. Adams suggests removal by carts from each house, and considers that it would be no difficult matter to distil them in gas retorts, to use the gas produced for lighting, and the residual charcoal as fuel. But Mr. Adams does not offer any suggestion as to the means by which, for this purpose, the fæces are to be dried and deprived of their water, amounting to more than 7-10ths by weight.

To compensate for the purification by water, Mr. Adams says: "In constructing closets without water the arrangement must be such as to separate the fluid from the solid by a diaphragm. To prevent a gaseous odour from arising two processes may be used—First, a chemical absorbent; and, secondly, an inch or two of fluid oil floating on the surface, through which both fluid and solid will pass, and be thus hermetically sealed. Probably a gallon of oil at about 3s. would be required once in

three months. In a family of twelve persons the total solid produce in three months would be about three feet. If made to fall into a cast-iron retort built into a furnace it would take scarcely any trouble, and only a few hours of a night, once in three months, to burn a few coals and utterly destroy it, burning the gas evolved at the same time."

It appears, therefore, very evident, from these facts, that Mr. Adams must have disregarded some important data in devising this very ingenious scheme.

However, under the system of sewers, which is now general in London, and which prevails more or less in most towns throughout this kingdom, the utilisation of excremental material in this manner is impossible, on account of the large proportion of water with which it is blended in its passage into the sewers; and the profitable use of nightsoil as a manure, either in the natural state, or prepared by any of the methods already described, will be restricted to the immediate neighbourhood of those places where water-closets are not in general use.

In town sewage, the chief element of manure value is the excremental material, and this, in the instance of London, with a population of 2,600,000, amounts annually to 53,393 tons of dry solid, which, as already shown, contains ingredients which give it a value of £15 per ton at least.

The quantity of ammonia NH_4O which this contains or is capable of producing is	11,440 tons
The phosphoric acid PO_5	1,839 "
And the potash KO	1,331 "

These three items make up a money value of about £836,834. In this estimate no account is taken of the suspended particles of animal substance, such as skin, hair, &c., which find their way into the sewers, from various sources, and which Mr. Campbell found to represent a quantity of ammonia nearly equal to 0·4 per cent. of the dry solid residue obtained by evaporating sewage water. In addition to these substances, the quantity of soda (NaO), calculated from the same data, and originating from excreta, amounts annually to upwards of 2000 tons.

It may be that materials of agricultural value flow into the sewers of London even at the present time from other sources; but as this would not be the case when the sanitary arrangements of the town shall have acquired a normal condition, no notice of such materials can be required for the present purpose.

The circumstances which operate in the opposite direction—viz., in reducing the value of the sewage for agricultural purposes, consist chiefly in the admixture of the water consumed for household purposes, for some manufacturing operations, and also the rain falling upon the area drained by the sewers.

The water supply being very unequal in different towns, the sewage will be proportionately different in concentration, and probably also in condition, since the sewage of towns where there is a copious supply of water issues from the mouths of the sewers for the most part fresh, while that of towns where the water supply is small, or the construction of the sewers defective, is always putrid, and contains the greater part of the nitrogen in the state of ammoniacal salts.

In all towns in Great Britain which are supplied by water companies, the consumption is, in round numbers, from 12 to 20 gallons daily for each individual, inclusive of wholesale consumers. The difference arises chiefly from the fact that in many places there are neither water-closets nor sewers.

	Gallons per head daily.
Ashton-under-Lyne	14
Duckinfield	12 to 14
Bury	
Brighton	20
Preston	20
Edinburgh	25
Liverpool	22
Manchester	25
Glasgow	50

Where the consumption per head is least, closets are used only by a few, and where the consumption is high, closets are almost universal.

In some towns in America the supply reaches as much as 100 gallons per head daily.

In 1854 the water supply of London averaged 20 gallons per head daily; at the

present time it amounts to 32 gallons per head, the total amount supplied by the metropolitan water companies being 81,000,000 gallons daily; in addition to this, about 11,000,000 gallons are obtained daily from the deep wells for brewing and other manufacturing purposes, a considerable amount of which ultimately passes into the sewers. Then there is the rainfall, which, on the average, amounts to about 25 gallons per head daily, so that the total amount of water disposed of in London amounts to 167,000,000 gallons daily, or 60,955,000,000 yearly.

Consequently, the 53,393 tons of excremental substance produced in the year will be distributed throughout a quantity of water which, in round numbers, may be fixed at 250,000,000 tons; and one ton of excremental substance, containing the constituents that have a money value of £15, will be distributed through a mass of liquid weighing 4682 tons. Herein is the great difficulty of dealing with the sewage for agricultural purposes.

The water itself will contain some substances of value as manure: Nitric acid, organic substance, alkalies, amounting on the average to 0.5 grain potash in the gallon, and to 1.0 grain soda NaO in the gallon.

(*To be continued.*)

ALUM IN BREAD.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I have read with some interest the two articles in the last number of the *Pharmaceutical Journal*, on the different modes of analysis for the detection of alum in bread; and, while agreeing with the authors on the main facts, I feel that the matter is left in an unsettled and unsatisfactory state. I therefore purpose, by your favouring me with the insertion of this in your next Journal, to advance the question a step further.

That alumina in small quantity cannot be precipitated in an organic fluid, such as an infusion of bread, I believe will be admitted. Therefore the only mode of detecting it is by combustion; but as it has been found that alumina does enter into the composition of some kinds of wheat, the presence of this substance is not conclusive of the presence of alum. It is consequently necessary to prove the presence of the other constituents of this salt in more than normal amount, and a certain and easy process I believe is a desideratum. The following, I think, will be found to fulfil this:—

Let the bread be soaked in distilled water, rather strongly acidulated with nitric acid, for twenty-four or thirty-six hours. Pour off the liquor, and press the residue, if thought necessary, and filter. Divide the filtrate into two portions, and evaporate one part to dryness, and incinerate the extract. The ash is to be examined for alumina in the usual way.

To the second portion of the filtrate, add ammonia in slight excess; boil and filter; acidulate this again with nitric or hydrochloric acid, and test for sulphuric acid. In some cases it will be advisable to concentrate this fluid before precipitation. The results by this method are clear and unambiguous. The same process is equally applicable to flour.

I cannot conclude this letter without expressing my opinion, in opposition to the editorial remarks, relative to the right or wrong of using alum in bread; and right or wrong it must be.

In the first place, it opens the door to fraud and unequal competition. That which is indifferent in quality, is made to resemble the best, and probably sold for it.

Secondly. Can it be said with truth that invalids and young children sustain no injury by the use of such bread? The healthy and strong may feel no immediate injury, but is it certain the seeds of disease are not sown?

Thirdly. If permitted by law, what is to be the amount, and who is to know when that is exceeded?

In conclusion, I think it almost as necessary that our bread should be as free from admixture as our medicines.

I am, Sir, your obedient servant,

Bradford, May 14, 1857. F. M. Rimmington.

[We disclaim any intention of sanctioning directly or indirectly the use of alum or any other substance prohibited by law as an ingredient in bread. If any observations in this Journal should have been supposed to admit of such construction, we regret the existence of any ambiguity, and take this opportunity of placing the question in its proper light. The effect of alum when used in the manufacture of bread—the *modus operandi* by which it improves the appearance of inferior flour—the chemical state of the alum in bread in which it has been so incorporated—and the comparative sanitary qualities of bread with and without alum—are questions of fact which constitute a very legitimate and useful field for scientific inquiry. Supposing it to be proved that the injurious effects of alum have been somewhat exaggerated, or that alum is decomposed and does not exist as alum in bread, or that the deleterious properties of the alum (if any) might be counteracted or diminished by any modification of the process—it would not follow, as a necessary deduction, that the law prohibiting the use of alum should be disregarded. Although the above and other similar propositions have been entertained, and to some extent supported on scientific authority, the *primâ facie* prejudice is against that view of the question. There is a natural objection to any chemical process which has the effect of giving a bad sovereign the appearance of a good one, and before such process could be generally received as justifiable it would be necessary to prove that the result is intrinsically for all practical purposes conducive to the public interest or benefit. The *onus probandi* rests upon those who affirm the proposition, and the pages of a scientific Journal are open to a free discussion of both sides of the question. We have already stated, and repeated it in our last number, that the subject requires further investigation, pending which we give no sanction to a violation of the law, and still retain a very strong bias in favour of bread without alum—whenever it can be obtained.—Ed. Pharm. Journ.]

PARCHMENT-PAPER.

At a meeting of the Royal Institution, held on Friday, the 3rd of April, the subject of the discourse delivered by the Rev. J. Barlow, Vice-President and Secretary to the Institution, was "*On some modifications of woody fibre and their applications*," in the course of which an interesting description was given of the substance to which the name *Parchment-paper* has been applied. This substance is the invention of Mr. W. E. Gaine, C.E., by whom the process for its preparation has been patented. Mr. Barlow having described several of the applications of woody fibre, and particularly its application in the manufacture of paper, referred to the chemical and physical changes effected in paper and analogous fabrics by treating them with chemical agents. He contrasted with the pyroxylised textures of Kuhlmann and the gun-paper of Pelouze, the woven fabrics subjected to Mercer's process, and the *Parchment-paper*, the invention of Mr. Gaine. By acting on cloth with chloride of zinc, tin, or calcium, with sulphuric and arsenic acid, and, especially, by the caustic alkalies in the cold (the temperature sometimes being lowered to — 10° Fahr.), Mr. Mercer has obtained many important effects on the fineness and general appearance of cloth, and its susceptibility of dye. This subject was brought before the Royal Institution by Dr. Lyon Playfair, C.B.,* and it has since been closely investigated by Dr. Gladstone.† Mr. Mercer also experimented on the effect of acids on paper. It being known that sulphuric acid, under certain conditions, modified vegetable fibre, Mr. Gaine instituted a course of experiments to ascertain the exact strength of acid which would produce that effect on paper which he sought, as well as the time during which the paper should be subjected to its action.

* *Proceedings of the Royal Institution*, vol. i., p. 134 (1852).
† *Journal of the Chemical Society*, vol. v., p. 17 (1853).

He succeeded in discovering, that when paper is exposed to a mixture of two parts of concentrated sulphuric acid (*s. g.* 1.854, or thereabouts) with one part of water, for no longer time than is taken up in drawing it through the acid, it is immediately converted into a strong, tough, skin-like material. All traces of the sulphuric acid must be instantly removed by careful washing in water. If the strength of the acid much exceeds or falls short of these limits, the paper is either charred, or else converted into dextrine. The same conversion into dextrine also ensues, if the paper be allowed to remain for many minutes in the sulphuric acid after the change in its texture has been effected.

In a little more then than a second of time, a piece of porous and feeble unsized paper is thus converted into the *Parchment-paper*, a substance so strong, that a ring seven-eighths of an inch in width, and weighing no more than 23 grains, sustained 92 lbs.; a strip of parchment of the same dimensions supporting about 56 lbs. Though, like animal parchment, it absorbs water, water does not percolate through it. Though paper contracts in dimensions by this process of conversion into *Parchment-paper*, it receives no appreciable increase of weight, thus demonstrating that no sulphuric acid is either mechanically retained by it, or chemically combined with it. It has also been ascertained by analysis, that no trace of sulphur exists in the *Parchment-paper*. The fact of this paper retaining its chemical identity, constitutes an important distinction between it and the gun-papers of Pelouze and others. Unlike those substances, it is neither an electric, nor more combustible than unconverted paper of equal size and weight, nor soluble in ether or potash. Unlike common paper, it is not disintegrated by water; unlike common parchment, it is not decomposed by heat and moisture. In this remarkable operation, the action of the sulphuric acid may be classed among the phenomena ascribed to catalysis (or contact action). It is, however, conceivable that this acid does at first combine with the woody fibre, with or without the elimination of oxygen and hydrogen, as water; and that this compound is subsequently decomposed by the action of water in mass, during the washing process, the sulphuric acid being again replaced by an equivalent of water; for, as has been before stated, the weight of the paper remains the same before and after its conversion. Mr. Warren De la Rue and Dr. Müller are engaged in researches on this subject, which will be hereafter published.

Those who are interested in chemical inquiry will recal many instances of physical changes occurring in compound bodies, while these bodies retain the same elements in the same relative weights. The red iodide of mercury is readily converted by heat into its yellow modifications; yet, by the mere act of being rubbed, it is made to resume its former colour. Nothing is added to or taken from this substance in the course of these changes. The inert and permanent crystals of cyanuric acid are resolved by heat into cyanic acid—a volatile liquid, characterized by its pungent and penetrating odour, and so unstable that, soon after its preparation, it changes into a substance (cyamelide) which is solid, amorphous, and destitute of all acid properties. These substances, as well as fulminic acid (which, however, is known in combination only), contain carbon, nitrogen, oxygen, and hydrogen, in the same relative proportion. But the closest analogy to the production of *Parchment-paper*, scientifically considered, is perhaps afforded by what is called "the continuous process" in etherification. It will be remembered that, in this process, sulphuric acid, at a temperature of 284° Fah., converts an unlimited quantity of alcohol into ether and water. In the first stage of this process, as explained by Williamson, it would appear that the sulphuric acid combines with the elements of ether to form sulphovinic acid; and that, in the further progress of the operation, this compound, by coming into contact with a fresh equivalent of alcohol, is, in its turn, decomposed, and resolved into ether and sulphuric acid. The ether distils over together with the water resulting from the decomposition of the alcohol; the sulphuric acid remains in the retort, ready to act on the next portion. Here, as in the case of the *Parchment-paper*, the sulphuric acid does not form a permanent constituent of the resulting substance, though it takes so important a share in its production.

The strength of this new substance before alluded to, and its indestructibility by water, indicate many uses to which it may be applied. It will probably replace to some extent vellum in bookbinding; it will furnish material for legal documents, such as policies of insurance, scrip certificates, &c.; it will take the place of ordinary paper in school-books, and other books exposed to constant wear. Paper,

after having been printed either from the surface or in intaglio, is still capable of conversion by Mr. Gaine's method ; no part of the printed matter being obliterated by the process. *Parchment-paper* also promises to be of value for photographic purposes,* and also for artistic uses, in consequence of the manner in which it bears both oil and water-colour. It is about to be introduced into commerce by Messrs. Thomas de la Rue and Co.

ON THE SEA SAW-DUST OF THE PACIFIC.

BY JOHN DENIS MACDONALD, ESQ.,

Assistant Surgeon, R.N.

In this communication the author gives a description (illustrated by figures) of the remarkable little algal so frequently met with in the South Pacific, scattered over the surface of the water in broad streaks and patches of a pale yellowish-brown tint, and which is known under the name of "Sea Saw-dust."

After adverting to the occurrence of a similar phenomenon in other parts of the globe, and citing the account given of the *Trichodesmium erythræum* of the Red Sea by MM. Evernor Dupont and Montagne, together with a description extracted from the *Colombo Herald* of May 14, 1844, of what was obviously an example of a vegetable scum of the same kind occurring on the sea off Ceylon, the author remarks, that in the instances met with by himself he did not recognise the fœtid odour so generally and pointedly spoken of in the accounts of others. He then states results of his own observation as follows :—

"It was rather difficult at first to determine whether our species is to be referred to the Oscillatoridæ or the Confervidæ. In the latter, a linear series of tubular cells compose the filaments, which are thus said to be jointed, but in the former, although the filaments are tubular, simple and continuous without actual joints, a pseudo-jointed appearance is presented by the apposition of the little masses of contained colouring matter. Notwithstanding, having submitted the 'sea saw-dust' of the Pacific to microscopic examination on several occasions, I was much inclined to believe that the filaments were actually jointed ; and this view is supported by the circumstance that an empty tubule, or one in which the parietes may be traced continuously without being interrupted by joints or internal septa, has never fallen under our notice ; besides which the filaments are exceedingly brittle, usually suffering cleavage in the transverse direction. It, however, undoubtedly belongs to the Oscillatoridæ.

"When the filaments are first removed from the water, they may be observed adhering side by side in little bundles or fasciculi ; and besides the colouring matter, the little cells, or at least the intervals between the septa, contains globules of air, which sufficiently account for their buoyancy ; and, moreover, in this respect, although their abiding place is the open ocean, their habit can scarcely be regarded as very different from that of those species which flourish in damp localities exposed to the atmosphere.

"The filaments are all very short compared with their diameter, with rounded extremities ; and when immersed some little time in fluid so that the contained air-bubbles make their escape or are taken up, the pale colouring matter appears to fill the cells completely, and a central portion, a little darker than the rest, may be distinctly perceived in each compartment intersected by a very delicate transverse partition.

"We have found this species off the coast of Australia and in Moreton Bay, amongst the Polynesian Islands, and on two separate occasions off the Loyalty Group, in nearly the same geographical position."—*Proceedings of the Royal Society.*

ON THE EXISTENCE OF SILVER IN SEA-WATER.

BY FREDERICK FIELD, F.C.S.

In a paper first published by MM. Malaguti, Durocher, and Sarzeaud, in the *Annales de Chimie et de Physique*, xxviii., p. 129, and translated in the *Quarterly Journal of the Chemical Society*, vol. iii., p. 69, there is an account of the detection and estimation of silver in sea-water. The authors suspected the existence of the

* Photographs on this paper were exhibited.

metal from the extensive diffusion of silver in the mineral kingdom, the conversion of its sulphide into chloride by the prolonged action of soluble bodies containing chlorine, and the solubility of chloride of silver in chloride of sodium. The method pursued was by passing sulphuretted hydrogen through large quantities of water, and also by fusing the salts obtained by evaporation with litharge and subsequent cupellation.

As a solution of chloride of silver in chloride of sodium is instantly decomposed by metallic copper, chloride of copper being formed and silver precipitated, it appeared to me highly probable that the copper and the yellow metal used in sheathing the hulls of vessels must, after long exposure to sea-water, contain more silver than they did before having been exposed to its action, by decomposing chloride of silver in their passage through the sea, and depositing the metal on their surfaces. A large vessel, the Ana Guimaraens, now under the Chilian flag, was hauled down in the Bay of Herradura, near Coquimbo, for the purpose of being repaired, and the captain obligingly furnished me with a few ounces of the yellow metal from the bottom of the vessel. The investigation was interesting, as the metal had been on for more than seven years (an unusually long period), and the ship had been trading up and down the Pacific Ocean all that time. The metal, upon examination, was found to be exceedingly brittle, and could be broken between the fingers with great ease. 5000 grs. were dissolved in pure nitric acid, and the solution diluted; a few drops of hydrochloric acid were added, and the precipitate allowed to subside for three days. A large quantity of white insoluble matter had collected by that time at the bottom of the beaker. This was filtered off, dried, and fused with 100 grs. pure litharge and suitable proportions of bitartrate of potash and carbonate of soda, the ashes of the filter also being added. The resulting button of lead was subsequently cupelled, and yielded 2.01 grs. silver, or 1 lb. 1 oz. 2 dwt. 15 grs. troy per ton. This very large quantity could hardly be supposed to have existed in the original metal, as the value of the silver would be well worth the extraction. It is to be regretted that the captain had none of the original on board. A piece of yellow metal with which he was repairing the vessel yielded only 18 dwts. to the ton. I was enabled by the courtesy of the captain of the Nina, a brig which had just arrived in the Pacific from England, to obtain more satisfactory information. He gave me a piece of Muntz's yellow metal from his cabin, from the same lot with which the brig was sheathed, but which had never been in contact with salt water; and also a small portion from the hull of the ship after it had been on nearly three years. The experiments were performed as before, and the results were very striking:

grs.		grs.		oz. dwts. grs.	
1700 from cabin gave	.051	=.003	per cent.	=0 19 14	per ton
1700 from hull "	.400	=.023	"	=7 13 1	"

That which had been exposed to the sea having nearly eight times as much silver as the original sample.

Many other specimens were examined of metals from the bottoms of ships, and of pieces which are always kept on board in case of need, and it was invariably found that the former contained more silver than the latter. For instance, a piece from the hull of the Bergmann gave 5 ozs. 16 dwts. 18 grs. per ton, while that from the cabin yielded 4 ozs. 6 dwts. 12 grs. 200 grs. from a piece from the hull of the Parga gave .072 grs., and a piece of fresh metal .050; while from the Grasmere, only coppered a few months, 610 grs. from the hull gave .075, and from the cabin .072—a very slight difference indeed.

It will be observed that the amount of silver in the above specimens of fresh metal is very high, and it is probable that most of these are merely the re-rolling of masses of metal melted down from old sheathing, and have derived the greater part of their silver from the sea on former occasions. It is well known that the copper used in the manufacture of yellow metal is very pure, containing 2 or 3 dwts. of silver per ton, frequently not so much, and silver is very seldom associated with the other constituent, zinc. In order to arrive at more certain results, however, I have granulated some very pure copper, reserving some in a glass-stoppered bottle, and suspended the reminder (about 10 ounces) in a wooden box, perforated on all sides, a few feet under the surface of the Pacific Ocean. When occasion offers, the box is towed by a line at the stern of a vessel which is trading up and down the coast of Chili. It is almost too soon to expect any decisive results at present, but in a few months I hope to be enabled to send both the original copper and that which has been exposed to the action of the sea.—*Proceedings of the Royal Society.*

SALE OF POISONS, &c., BILL.

ARRANGEMENT OF CLAUSES.

COMMENCEMENT of Act, sect. 1. 14 and 15 Vict., c. 13, repealed, 2. Definition of poison, 3. Other substances and preparations may be added by order in Council to those in the schedules, 4. Poison to be sold only to a person of full age in presence of a witness of full age, and upon the production of a certificate, 5. Entries to be made regarding the sale of poisons, 6. All poisons, &c., sold, to have proper coverings, to be distinctly labelled, with address of vendor, and the word "Poison" to be moulded on the bottle, 7. Colourless solid poisons sold must be mixed with soot or indigo, 8. Colourless liquid poisons must be coloured by archil, 9. Gift of poisons to be subject to the provisions applicable to sales, 10. Prescriptions of medical men and sales by wholesale or for lawful use in trade or occupation exempted, 11. Poisons to be distinctly labelled and kept apart in the shop or dispensary. Poisonous medicines for external use to be put in coloured bottles of a peculiar shape, 12. Penalty for offending against the Act, 13. Schedules.

A BILL INTITULED AN ACT TO RESTRICT AND REGULATE THE SALE OF POISONS.

Whereas the existing restrictions on the sale of arsenic have been found to be insufficient, and the unrestricted sale of other poisons facilitates the commission of crime, and occasions frequent fatal accidents: Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

I. Save where herein otherwise provided, this Act shall commence and take effect from and after the day of One thousand eight hundred and fifty-seven.

II. The Act of the session holden in the fourteenth and fifteenth years of Her Majesty, chapter thirteen, "to regulate the sale of arsenic," shall be repealed.

III. In the construction of this Act the word "Poison" shall mean any drug or substance mentioned or referred to in the schedule (A) to this Act, and also any compound, preparation, or mixture containing any such drug or substance, except only such compounds, preparations, or mixtures as are specified in the schedule (B) to this Act.

IV. Provided, that in case it appear to Her Majesty in Council that the unrestricted sale of any drug or substance not mentioned in the schedule (A) to this Act should be subject to the restrictions of this Act, it shall be lawful for Her Majesty, with the advice of her Privy Council, to order that such drug or substance shall be subject to the provisions of this Act concerning poison ; and in case it appear to Her Majesty in Council that the sale of any compound, preparation, or mixture containing any drug or substance, being poison within the meaning of this Act, may be safely exempted from the restrictions of this Act, it shall be lawful for Her Majesty, with such advice as aforesaid, to order that such compound, preparation, or mixture shall be exempted from the provisions of this Act applicable to poison ; and every order in Council made under this provision shall be published in the *London Gazette ;* and upon the expiration of one month after the publication of such order, unless a later time be mentioned in such order, and in that case after the time so mentioned, the drug or substance thereby declared subject to the provisions of this Act concerning poison shall for all the purposes of this Act be deemed poison, as if it had been mentioned or referred to in the schedule (A) to this Act ; and any compound, preparation, or mixture declared by such order to be excepted from the provisions of this Act concerning poison, shall be so excepted accordingly, as if it had been specified in the schedule (B) to this Act.

V. No person shall sell any poison, on any pretence whatsoever, unless the sale be made to a person of full age, and in the presence of a witness of full age, who is known to the person selling the poison, and to whom the purchaser is known, and unless there be produced and delivered to the seller, before such sale, a written certificate, signed by the clergyman of the parish or district, or a legally qualified medical practitioner, or a justice of the peace acting for the county or place, and dated, stating that the person giving such certificate knows the applicant, and believes that the poison may be safely supplied to him, and is to be used for the purpose of his trade, or for some other lawful purpose to be mentioned in such certificate, and all such certificates shall be carefully preserved by the seller in the order in which they are received.

VI. Every person who sells any poison shall forthwith, and before the delivery of the same, enter or cause to be entered, in a fair and regular manner, in a book or books to be kept for such purpose, in the form set forth in the schedule (C) to this Act, or to the like effect, a statement of such sale, and the following particulars :—

1. The date of the sale and delivery of such poison:
2. The name and surname of the purchaser:
3. His place of abode, condition, or occupation:
4. The name and quantity of the poison sold:
5. The purpose for which such poison is stated to be required:
6. The name and condition of the person giving the certificate for such purchase with the date of such certificate.

Into all of which circumstances the person selling such poison is hereby required and authorized to inquire of the purchaser before the delivery of the poison; and such entries shall in every case be signed by the person making the same, and shall also be signed by the purchaser and by the witness, who shall add his place of abode.

VII. No poison sold shall be wrapped in paper only without a covering of tinfoil, and all poison sold shall have the bottle, or other vessel, box, wrapper, or cover (as the case may be), containing such poison, distinctly labelled in conspicuous capital letters, white on a black ground, with the word "POISON," and with the name and surname and address of the person selling such poison, and every bottle containing any such poison shall have the word "POISON" cast or moulded in raised letters on four sides of the bottle.

VIII. No person shall sell any colourless poison whatsoever in a solid state, unless the same be before the sale thereof mixed with soot or indigo in the proportion of one part by weight of soot at the least to fifteen parts by weight of the poison, or of one part by weight of powdered indigo at the least to thirty-one parts by weight of the poison, save where such poison is stated in the certificate to be required for some lawful purpose for which such admixture would, according to the representation of the person giving the certificate, render it unfit, and in that case such poison may be sold without such admixture in quantities of not less than half a pound.

IX. No person shall sell any colourless poison whatsoever in a liquid state, unless the same be before the sale thereof mixed with such a quantity of a strong solution of archil, not being less than ten minims by measure to one fluid ounce of the poison, as will give the fluid a decided colour, save where the poison is stated in the certificate to be required for some purpose for which such admixture would, according to the representation of the person giving the certificate, render it unfit, in which case such poison may be sold without such admixture.

X. If any poison be given or delivered (whether gratuitously or in exchange for any other article or thing) by any person whatsoever to any other person, such gift or delivery shall for the purposes of this Act be deemed a sale, and all the provisions and penalties of this Act applicable to a sale of poison shall apply to such gift and delivery, and for the purposes of this Act the person giving or delivering the poison shall be deemed the seller, and the person to whom the same is given or delivered shall be deemed the purchaser.

XI. The provisions hereinbefore contained shall not extend to the sale of any medicine required to be made up or compounded according to the prescription of a legally qualified medical practitioner, or made up or compounded by a legally qualified medical practitioner, or to the sale of poisons by wholesale to retail dealers, or legally qualified medical practitioners, upon orders in writing, in the ordinary course of wholesale dealing, or by wholesale or retail to Manufacturing or Analytical Chemists, or by or to persons carrying on the trade or business of painters, manufacturers of, and dealers in colours, artists' colourmen, glass or shot manufacturers, veterinary surgeons, dyers, paperstainers, electro-platers, photographers, braziers, whitesmiths, bird-stuffers, or firework makers, provided the poison is stated to be required and may be reasonably believed to be required for the ordinary purposes of trade or lawful occupation, and not for any other purpose whatsoever.

XII. And whereas it is expedient that as well members of the medical profession as others should be subject to regulations in respect of the keeping of poisons and the delivery of poisonous preparations intended for external use :

Every person who keeps for sale by retail any poison, and every Apothecary, Surgeon Apothecary, or other member of the medical profession, and every officer of any hospital infirmary, or dispensary, who has under his custody any poisons, shall keep all such poisons separated from all other drugs and medicines, and dis-

tinctly labelled with their proper English names, in a closet set apart for this purpose, under lock and key:

All liquid medicines intended for external use, and consisting of or containing any poison, shall be sold and delivered in bottles of blue coloured glass, and of a quadrangular shape, and labelled in conspicuous capital letters, white on a black ground, "POISON," or "FOR EXTERNAL USE;" the word "POISON," or the words "FOR EXTERNAL USE," being also cast or moulded in raised letters in the glass on the four sides of the bottle.

XIII. If any person sell any poison, save as authorized by this Act;

Or deliver the same, without having made and signed the entries hereby required on such sale, or without having obtained such signatures to such entries as are required by this Act, or without complying with all the provisions of this Act in relation to the sale of such poison;

Or if any person purchasing any poison give false information to the person selling the same in relation to the particulars which such last-mentioned person is hereby authorized to inquire into of such purchaser, or procure, by a false certificate or other false pretence, such poison, or procure by false pretences a certificate for the purchase of poison from any clergyman, medical practitioner, or justice of the peace;

Or if any person sign his name as aforesaid as a witness to a sale of poison to a person unknown to the person so signing as a witness;

Or if any person hereby required to keep any poison under lock and key as hereinbefore mentioned fail so to keep such poison at all times, except when actually selling, dispensing, or lawfully using such poison;

Or if any person sell or deliver any liquid intended for external use, and containing any poison, otherwise than in such a bottle of coloured glass as aforesaid, and labelled as aforesaid;

Every person so offending shall for every such offence, upon a summary conviction of the same before two justices of the peace in England or Ireland, or before two justices of the peace or the sheriff in Scotland, be liable to a penalty not exceeding twenty pounds for the first offence, and to a penalty not exceeding fifty pounds for the second, or any subsequent offence;

And the person so convicted of such second or subsequent offence shall be for ever thereafter disabled from selling any poison, or carrying on the business of a Chemist and Druggist; and if such person so disabled sell to any person, or in any manner whatsoever, any poison, or any compound, preparation, or mixture containing any poison, or carry on the business of a Chemist and Druggist, or sell any drug or medicinal substance whatsoever, every person so offending shall for every such offence, upon a summary conviction of the same before two justices of the peace in England or Ireland, or before two justices of the peace or the sheriff in Scotland, be liable to a penalty not exceeding fifty pounds.

Schedules to which the Act refers.

SCHEDULE (A).

Arsenic and its compounds. Corrosive sublimate and its compounds. The poisonous vegetable alkaloids. Prussic acid. Cyanides of potassium, mercury, and silver. Chlorides of zinc and antimony. Essential oil of bitter almonds, and any mixture containing it. Cantharides and its preparations. Belladonna and its preparations. Hemlock and its preparations. Aconite and its preparations. Opium in tincture, extract, and powder. Foxglove and its preparations. Stramonium and its preparations. Chloroform and its compounds. Oxalic acid and binoxalate of potash. Nux vomica seeds and bark. Tartarized antimony and its solution. Cocculus indicus. Ergot of rye. Savin. Lobelia. And all liquids or solids containing or consisting wholly or in part of the above-mentioned poisons, poisonous drugs and herbs.

SCHEDULE (B).

The under-mentioned compounds, prepared according to the directions of the Pharmacopœias of London, Edinburgh, and Dublin, or any of them:—Sulphuric, nitric, and muriatic acids, diluted according to the formulæ of the British Pharmacopœias, or with a larger proportion of water. Cerate, ointment, and plaster of cantharides, blistering cloth. Plaster and ointment of belladonna. Compound pill of hemlock of the London Pharmacopœia. Compound pill of soap of the London and Dublin Pharmacopœias. Pill of calomel and opium (Edinburgh Pharmacopœias). Pill of lead and opium (Edinburgh Pharmacopœia). Compound powder of chalk with opium (London Pharmacopœia). Electuary of opium (Edinburgh Pharmacopœia). Confection of opium (London Pharmacopœia). Plaster of opium (London, Edinburgh, and Dublin Pharmacopœias). Liniment of opium (London and Edinburgh Pharmacopœias). Ammoniated tincture of opium (Edinburgh Pharmacopœia). Ointment of opium (London Pharmacopœia).

Compound ointment of the gall nut (London and Edinburgh Pharmacopœias). Compound pill of storax (London and Edinburgh Pharmacopœias). Compound powder of ipecacuanha (London, Edinburgh, and Dublin Pharmacopœias). Pill of ipecacuanha and opium (Edinburgh Pharmacopœia). Compound powder of kino (London Pharmacopœia). Electuary of catechu (Edinburgh Pharmacopœia). Pill of foxglove and squills (Edinburgh Pharmacopœia). Ointment of tartarized antimony (London, Edinburgh, and Dublin Pharmacopœias). Savin ointment (London Edinburgh, and Dublin Pharmacopœias).

SCHEDULE (C).

Date of Sale and Delivery.	Name and Surname of Purchaser.	Purchaser's Place of Abode and Occupation.	Name and Quantity of Poison sold.	Purpose for which required.	Name of Person giving Certificate.
Saturday, Sept. 26, 1856. 10 30 A.M.	*Henry Holmes*	27, *Snow's Fields, Bermondsey, Shoemaker.*	*Arsenic ½ lb. Coloured blue with Indigo.*	*For destroying Rats and Mice.*	*James Paget, Incumbent of St. Olave's, Bermondsey.*

(*Signature of Purchaser.*)
HENRY HOLMES.

(*Signature of Witness.*)
JOHN SIMS,
26, Tooley Street,
Southwark.

(*Signature of Vendor.*)
SAMUEL EDWARDS,
Licenced Druggist,
18, King Street,
Southwark. }*

PHARMACEUTICAL SOCIETY, VICTORIA.

A MEETING of the principal Chemists and Druggists of the city took place at the Mechanics' Institution on Friday evening, March 6, for the purpose of establishing a Pharmaceutical Society for Victoria, of a similar character to the one founded many years ago in Great Britain.

The Hon. J. Hood, M.L.C., was called to the chair, and briefly stated the objects of the meeting.

The secretary, Mr. Williams, read several communications, and the following report:

Report of the Committee appointed at a meeting of Chemists and Druggists, held at the house of Mr. Croad, Bourke-street, on the 16th ultimo:

In consequence of the various attempts that have been made of late to interfere, by legislative enactment and otherwise, with the Chemists and Druggists of this colony, it has been thought by many of the principal members of the trade in and around Melbourne and Geelong that an organisation should be instituted, for the purpose of protecting the trade generally, and also of elevating its character and position.

These ideas were, however, allowed to slumber until Dr. Tierney brought into the Legislative Council his "Poisons Bill," for the regulation of the sale and the safe keeping of all poisonous and deleterious drugs.

On the appearance of this bill the trade felt justly indignant that a measure likely to affect their interest so materially should have been introduced without any consultation, and accordingly met in considerable numbers at the house of Mr. Croad, and determined at once to send in a petition against the passing of such a crude and unnecessary measure. The petition was accordingly prepared and signed by every member of the trade in and around Melbourne and Geelong, and placed in the hands of the Hon. J. Hood, M.L.C., for presentation to the Council. A second meeting was held at the same place on the 16th ultimo, when your committee was appointed, consisting of Messrs. Croad, Williams, Blackett, Ford, Bosisto, Walton, Glover, and Lewis, for the purpose of waiting upon the members of the Legislative Council, and urging the necessity for the rejection of the "Poisons Bill" then before that House, and also to take the necessary steps for the formation of an association of Chemists and Druggists.

Respecting the first part of their duty, your committee have the pleasure to report

* Address unnecessary if placed on article sold.

that any lengthened opposition became unnecessary, as on the following day Dr. Tierney thought it most prudent to withdraw the bill, and the matter is now before a select committee of the Legislative Council, and it is believed that a considerable time will elapse before anything more will be heard about "The Poison Regulation Bill." Thus much for the first part of your instructions. And in coming to the subject of the formation of an association, your committee think that from what has already transpired, it is imperatively necessary that immediate steps be taken for the formation of an association which shall be in existence, and at all times ready to take action should any attempt be made to infringe upon the rights and privileges of Chemists and Druggists. The very fact of organisation existing will probably prevent the bringing forward any measure affecting the trade generally, without first submitting it for consideration to the council of the association.

Your committee would, however, desire to place the subject before you for consideration on higher grounds. Desirable as it is to be properly organised, that we may be in a position to repel unjust attacks, it is of greater consequence that we should have an organisation that will enable us to perfect ourselves in the art and science of pharmacy, afford opportunity and appliances for carrying out experiments, and be a means of increasing our knowledge and promoting our comfort. None need be ashamed to own that there is much yet to learn, and a wide field still open for profitable investigation.

Your committee would wish to refer you to the good that has resulted in England from the establishment of the Pharmaceutical Society of Great Britain; and, great as have been the results of its efforts, your committee are strongly of opinion that still greater good will arise from the proper organisation of a society, kindred in its character, for Victoria.

The benefits that might be enumerated are, in the first place, the elevation of the trade in character, proper instruction for apprentices that may hereafter come in, a registry for all competent assistants, and also the formation of a benevolent fund for any indigent or unfortunate members.

Should the society be established and properly supported, a library, museum, lecture-room, and laboratory should be instituted, and these alone would be worth all the trouble and expense that we might find it necessary to incur. By these means the young men and apprentices, and trade generally, would have a suitable place to resort, where they might spend their time in improving themselves in all that is essential for the proper discharge of their duties in the laboratory and shop.

Signed, on behalf of the committee,

G. H. Williams, Secretary.

It was moved by Mr. Cooper, seconded by Mr. Dunstone, "That an Association of Chemists and Druggists be now formed, to be called 'The Pharmaceutical Society of Victoria,' having for its object the advancement of pharmacy, by furnishing such a uniform system of education as shall secure to the profession and the public the safest and most efficient administration of medicine, and the uniting of its members into a recognised and independent body."

Mr. Croad supported the resolution, and urged the propriety of establishing a pharmaceutical journal, as a medium through which the details of the operations of the society shall be made manifest.

Mr. Bowen thought it was premature to attempt to follow too strictly the rules and regulations of the society of the mother country, and recommended that the society should "feel its way" before going into the entirety of the rules of the society of Great Britain.

The report was adopted.

The Honorary Secretary then read the rules of the proposed society, and it was unanimously resolved that the rules should be sent to each individual member. The rules read were those of the Pharmaceutical Society of Great Britain, which appeared to be fully adapted to the Victoria Society.

The Chairman thought that the rules were a little too extended to apply *in toto* to the requirements of the colony, and recommended that a court of examiners be appointed for the purpose of limiting the supply of admissions to the trade.

The resolution was unanimously carried.

Mr. Ford proposed "That the rules be referred to the provisional committee for revision, and that they should be further considered after being printed and circulated."

Mr. Wrentmore seconded the resolution.

Mr. Williams thought the remarks of Mr. Bowen were not altogether correct, as

he considered it would be highly necessary to lay the foundation of the society as broadly as possible, and that the sooner a museum was commenced the more perfect it would become.

Mr. KINGSLAND then proposed, and Mr. PLUMMER seconded, "That the following gentlemen be a provisional committee to carry out the foregoing resolutions, admit members, and disburse expenses: Messrs. Johnstone, St. Kilda; Archer, Thomas, Geelong; F. Cooper, Great Collins Street; French, William's Town; Croad, Blackett, Ford, Bosisto, Coulton, Glover, Lewis, and Williams.

A vote of thanks to the Chairman terminated the proceedings.—*The Melbourne Age*, March 7, 1857.

PEPSINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—It would appear from the pamphlets and scientific papers on the subject of pepsin, or, as it is now termed, pepsine, that it is a discovery of recent invention. Will you therefore permit me the privilege of your valuable columns to prove the contrary to be the fact. It has been in use in the United States of America for many years, under the name of pepsin, and much good has been attributed to its effects.

Amongst the many eminent physiological chemists who have written on its merits, will be found Baron Liebig, in his work on *Animal Chemistry;* Dr. Coombe, on the *Physiology of Digestion;* Dr. Graham, on *Vegetable Diet;* the late Dr. Pereira, on *Food and Diet;* Dr. J. Draper, of New York University; Dr. Carpenter, Professor Silliman, Professor Dunglison, and many others.

Six years since I made experiments on the efficiency of the gastric juice of animals (which I made public in a paper I then published) as a substitute for that solvent in the human stomach, and found that the mucous membrane of the stomach of the calf yielded a more powerful pepsin than that of the sheep or the ox; which opinion is confirmed by some of the learned writers to whose works I have referred. As far as my own observations extend, I have no hesitation in saying that it will be found to form an artificial digestive medium, precisely analogous to the gastric juice, and furnishing a complete and perfect substitute for it; and that in those cases where a deficiency of its secretion is denoted, it will be found a remedy without an equal.

Should, therefore, any of your readers regard pepsin as a recent discovery, I trust these brief remarks will place them right.

I remain, yours most obediently,

Square, Barnstaple, May 6th, 1857. HENRY PARKER.

PATENTS FOR COATING PILLS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—The two processes described in the last number of the *Pharmaceutical Journal* for coating pills, and introduced as something new, have both been the subjects of patents.

A patent for rendering pills tasteless by a coating of gelatine was granted to Mr. William Palmer many years ago—more recently I obtained a patent for coating pills with resinous gum. Any infringement of my patent is an act of dishonesty, and I shall seek redress in the Courts of Law.

I am, Sir, your obedient Servant,

ARTHUR H. COX, Chemist, Brighton.

THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I take the liberty of addressing a few lines to you on the subject of the proposed Act for the Sale of Poisons, now in the House of Lords, to know whether any movement is being made by the trade in general to see that justice is done to us, and that we may not have a bungling piece of machinery made that it will be impossible to work; if any movement is making, I will cheerfully send up my contribution towards it. This colouring system, which our law-makers seem to think so clever, is simply absurd—here, in the country, arsenic is sold consider-

ably; the man who has 1000 sheep may have his 10 lb. of arsenic *un*coloured, but the man who has only 100 must have his coloured with the black or blue. Need I tell you that the farmers won't have their wool dyed gratuitously, and we sell the arsenic white and genuine. Now, as regards the new Act, how are we to colour nux vomica. Some of these very wise heads will be ordering their grooms to get their hunters ready, and to see that the boot-tops, saddles, &c., are all clean; but if the oxalic acid is sent according to their order, will they not be rather surprised to see their grooms with blue tops smiling at their own blue stockings? Take the straw trade—what colour shall we have our women's bonnets, hats, &c.? It can never be sold but as pure oxalic acid. I believe I only express the feelings of the whole trade. The ironmonger sells "driers" in the shape of plumbi acetas, zinci sulphas, &c., with impunity, not even labelled! Was the idea of taking a man's business away from him on a second conviction, obtained from Russia? Certainly 'tis new to English ears. How many dozens of pennyworths of white precipitate are sold by every Druggist in the course of the year? Are the poor people to be sent to the parson of the parish (our rector lives two miles off) to get a certificate that the poor woman merely wants to kill "bobs" in her children's heads. In Dunstable and Luton there are *tons* of oxalic acid annually sold, so also of salt of sorrel.

Your obedient Servant,

Petersfield, 25th May, 1857. HY. NICHOLS.

WE have received the following extract from a newspaper, with comments from a correspondent:—

SUICIDE.

"Yesterday, Mr. C. Jewison, the coroner, held an inquest at the Fox and Hounds Inn, Bradford, touching the death of James Hustler. The deceased, who was thirty-six years of age, resided in Jury Street, North-wing. He had been unwell and in a desponding state of mind for some time. Yesterday morning, about seven o'clock, while his wife was employed at a mill, a young woman discovered him suspended by the neck in the staircase of his dwelling. Some neighbours who were called in cut him down. The jury returned a verdict that the deceased had hanged himself while in a state of temporary insanity."

Please to read the enclosed and consider the importance of obtaining an Act of Parliament to prevent persons selling rope! or stockings! unless the buyer has obtained a certificate from a priest or medical man, or is accompanied by a sane person! of mature age! Also to have all persons buying cutlery! watched, and if found to feel the sharpness of that cutlery, to have them immediately brought before a magistrate, and if not able to give a good account of themselves, to send them to a lunatic asylum forthwith. Also all persons buying firearms to be provided with a certificate from a priest or medical man to the effect that they do not intend to make an improper use of them. Also all persons found walking alone! near the sea or a river, or on a mountain or any precipitous place, to be immediately brought before a magistrate, and if not able to give a good account of themselves, to be sent to a lunatic asylum! That sane priests and medical men be appointed at £2000 per annum to give certificates, &c.; also a larger number of magistrates at the same sum; that grants be made to build lunatic asylums to any extent that may be required. That the person bringing in the Bill to regulate the Sale of Poisons be examined, and if found to have common sense? to be set at liberty; if not, to have his house searched, and if any of the before enumerated articles be found, and he not able to give a good account of himself, that he be taken care of immediately, until an asylum of sufficient magnitude be built to receive him.

SUICIDE FROM MORPHIA.

ON Monday, May 11th, Mr. W. J. Payne held an inquest at the Spotted Dog, Strand, respecting the death of Mr. George Fife, aged 50, who, it was stated, was a medical gentleman of some eminence at Birmingham, and was brother to Sir John Fife. The deceased was a member of Queen's College, and professor of Materia Medica. It was proved in evidence that on Friday evening the deceased went to the shop of Mr. Burfield, chemist, Norfolk-street, Strand, and asked for some morphia, which he said he took in small doses to procure sleep. Mr. Burfield's assistant gave the deceased some morphia in a phial, but said he should not have done so if he had not known him to be a medical man. A tonic medicine was also sold to the deceased at the same time. The deceased went to the Strand Theatre on Friday night, and when he returned home to his lodgings in Surrey-street, Strand, he appeared to be in an excited state from drink. Next morning he was found dead in bed. A surgeon

who was called in said the deceased undoubtedly died from the effects of morphia, and that, presuming the bottle which had contained it had been full, there was enough to kill four persons. According to one witness, the deceased had said that family matters preyed upon his mind. The jury returned a verdict "That the deceased died from an over-dose of morphia, he being at the time in a state of intoxication, but that he had no intention of wilfully destroying his life."

POISONING BY MISTAKE.

TO THE EDITOR OF THE TIMES.

SIR,—A few weeks ago I directed public attention through the medium of your columns to the danger of "children's balloons" in consequence of their being inflated with hydrogen gas. Permit me now to say a few words on a danger of a different kind—viz., the liability, under the present lax state of the law, of swallowing a dose of poison in mistake for medicine.

The following narrow escape has just occurred in this city:—A lady was ordered by her medical attendant to take two teaspoonfuls of the tincture of rhubarb, and the usual bottle was returned to the druggist for the purpose of being refilled. The master of the shop was absent, and a boy, left in charge, supplied the demand by pouring inadvertently the tincture of opium (laudanum) into the bottle labelled "Tincture of rhubarb;" and nearly two teaspoonfuls of this narcotic poison, instead of the prescribed medicine, had already reached the lips of the patient, when her sister's attention was excited by the colour, and the mistake was discovered. Had the dose been swallowed, no human skill could, under the peculiar circumstances, have saved the lady's life.

I am aware that legislative measures are in contemplation to meet the danger that arises from boys, or incompetent men, being allowed to dispense poisonous drugs. The publication of facts bearing on this important subject may accelerate the movement. It is full time that a remedy was provided against the recurrence of the danger; and, let me add, that in Scotland, where there are no coroners' inquests to search into the causes of accidental death—a deficiency greatly to be deplored—the most stringent measures ought to be adopted to regulate the sale of poisons.

I remain, Sir, your obedient servant,

Glasgow, May 18. M.D.

CARELESSNESS IN THE SALE OF POISONS.

AN inquest was held on Monday last at Louth, on the body of a child aged two years and five months, named Charles Houseman, son of Samuel Houseman, a gardener. It appears that a phial of laudanum was left by Houseman upon a table, and that the child drank a portion of it, and was found in a state of stupor. It died the same night. The man who sold the poison was a grocer, who keeps it for the "accommodation" of the public, but does not even label the bottles. The coroner said to this man—"If death had resulted to an adult person you would have been placed in a most perilous position. Not only have you neglected to place a label on the phial describing the contents as poison, but you allowed it to go out of your shop with a label upon it describing the contents to be 'Dalby's Carminative,' a harmless mixture. You see it is now upon the bottle. In this case, however, the deceased child was so young that it could not read, but had it been otherwise you would have been placed in an awful position. I would recommend you to be careful." The jury, after a short consultation, returned a verdict of "Accidental death."—*Times*, May 23.

BOOKS RECEIVED.

TRANSACTIONS OF THE MEDICAL AND PHYSICAL SOCIETY OF BOMBAY, *for the Years* 1855 *and* 1856. Bombay: Printed at the Bombay Education Society's Press, 1857.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY, *including the Practice of the Collodion Process.* By T. FREDERICK HARDWICH, Lecturer on Photography in King's College, London, &c. Fourth edition. London: John Churchill, New Burlington-street, 1857. (From the Author.)

ON THE CONSTITUTION OF ALLOPHANE. By AUGUSTUS BEAUCHAMP NORTHCOTE, F.C.E., &c. 1857. (From the Author.)

GOD IN DISEASE; *or, the Manifestations of Design in Morbid Phenomena.* By JAMES FOULIS DUNCAN, M.D., &c. Second edition. London: James Nisbet & Co., Berners Street. Dublin: George Herbert. 8vo, pp. 323. 1857.

TO CORRESPONDENTS.

W. M. H. (Dublin).—As the Pharmacy Act does not apply to Ireland, the Society has no power to prevent the use of the title "Pharmaceutical Chemist" by unqualified persons in that part of the kingdom.

J. T. (York).—(1.) *Oil of Tobacco:* see vol. iii., p. 342; and Pereira, *Mat. Med.*, p. 1426. (2.) The examinations in Botany are conducted according to the natural system.

W. E. (London).—When Liquor Antimonii Tartarizati is ordered, we think Vinum Antimonii Potassio-tartratis is generally intended; but it would be more correct to use the former, which is still retained in the Dublin Pharmacopœia.

M. P. S. (Bristol) should apply, by letter, to Professor Morton, Veterinary College, Camden Town.

G. W. (Derby).—Lindley's *School Botany*, price 5*s.* 6*d.* Bradbury & Evans.

Dolor (London).—The label referred to is scarcely liable to the stamp duty, but is sailing very near the wind.

W. P. (Liverpool).—Hooper's *Medical Dictionary*, last edition.

C. T. E.—Coating of Pills: see p. 546 of our last number.

Verus (Liverpool).—In the mixture alluded to, the addition of mucilage is necessary to prevent the separation of the balsams.

A. B. C.—It would be invidious to answer such a question in this journal.

T. P. (Cork).—The specimen of quackery has been received.

A Member, who signs himself "One who desires to expel those who do any act unbecoming their position," wishes to draw attention to the fact, that some Members of the Pharmaceutical Society make use of a "halfpenny newspaper" as an advertising medium.—[We cannot quite see how the price of the newspaper affects the question.]

Mr. Kernot (Poplar) and *Mr. Rook* (Sittingbourne) are thanked for their enclosures.

Delta (London).—The *Journal de Pharmacie et de Chimie* is published under the direction of a committee of sixteen Chemists. It may be obtained through Messrs. Williams & Norgate, Henrietta Street, Covent Garden.

A. Z. (London).—(1.) *Bastick's Medicated Cod Liver Oil*, vol. xiv., page 427. (2.) No.

A Student (Evesham).—(1.) The work is useful to a beginner. (2.) In some cases.

J. W. (Cork).—The specimen of Bark sent to us is "Quillaia saponaria," native of Chili. See *Chemical Gazette*, vol. ii., p. 216.

Mr. Turner, *Mr. Large*, *Mr. Rimmington*, *Mr. Southall*, and several other correspondents, some of whom have been answered by post, have written on the subject of the Poison Bill.

A. P. S.—There is nothing remarkable in the extract. Judging from its appearance, we should say it is of average quality.

Mr. Tuff (Enfield).—There was no opportunity of reading the letter at the meeting. One of the subjects was discussed; the others have not been overlooked.

W. J. (Manchester).—Jeremie's solution of opium is a quack medicine, of which we have no formula.

Botanicus (March).—(1.) Normandy's *Agricultural Chemistry*.—(2.) We know of no work (arranged according to the Linnean system) answering to the description given. Lindley's *Vegetable Kingdom* is the best work.

R. E. (Huddersfield), *M. P. S.* (Glasgow).—We are unable to give the information.

Errata.—Page 541, line 14 from bottom, *for* De Vallenger, *read* De Valangin.—Page 572, line 4, *for* 3 lbs. of salt to one of flowers, *read* 1 lb. of salt to 3 of flowers. This error was corrected by Mr. Haselden in the number following that in which his paper appeared.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

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END OF VOL. XVI.

C. WHITING, BEAUFORT HOUSE, STRAND.

THE PHARMACEUTICAL JOURNAL.

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LEGISLATION AGAINST POISON.

We have printed entire, in another part of this number, the "Bill intituled an Act to Restrict and Regulate the Sale of Poisons," which was alluded to at the Adjourned Annual Meeting of the Society on the 22nd of May. The Bill was not printed in time for discussion on that occasion, as copies of it could not be obtained until after the close of the meeting. It will be the duty of the new Council at the first meeting, to be held on the 3rd of June, to consider the provisions of this measure, and to take such steps as may appear expedient for protecting the profession and the public against such an infliction. The subject will also be discussed at a Special Pharmaceutical Meeting, to be held at the house of the Society, on Wednesday evening, June 3rd. Although it cannot be supposed for a moment that the Bill is at all likely to be passed in its present form, yet the principle displayed in it may be taken as an indication of the direction in which legislation is tending, and the experience of those who are practically conversant with the subject must be brought into requisition to expose the absurdities of the measure, and to point out the boundary-line between the sublime and the ridiculous.

That it is desirable to place some check upon the facilities for obtaining dangerous substances, and to adopt the most effectual precautions that can be devised against accidents in the use of domestic medicines, is a proposition which admits of no dispute; and it should be the primary object of any measure which may be introduced for the purpose, to increase the difficulty of criminal poisoning without needless interference with the prerogative of the medical profession, the requirements of art and science, and the general convenience of the public.

No professional sagacity is required to expose the impracticability of some of the proposed regulations in the Bill now before us. This has been forcibly pointed out in the *Times* of May 22nd, where the dilemma of a person requiring a few drops of laudanum for toothache or any other ailment is described by way of illustration. This, however, is only one instalment of the perplexity; a new "field of usefulness" (?) is here imposed upon the clergy and on justices of the peace, who will be liable to be called upon at all hours for certificates by persons requiring poison, whether for medicinal use, for purposes of trade, or for scientific processes. It may be a question with medical men when thus applied to whether the certificate does not imply or include professional advice, entitling them to a fee. It will of course be necessary to have printed forms of certificate, and in consequence of the difficulty of obtaining the medicines enumerated in Schedule A in cases of emergency, prudent persons will find it expedient to be provided with a stock of such medicines, so as to avoid the dilemma described in the *Times*, and as the supply of all articles of consumption is regulated by the demand, we may expect to see advertised among other domestic remedies, "Convenient travelling chests, containing all or any of the medicines in Schedule A, in angular blue bottles, with black and white labels, as the Act directs."

The provision that all the scheduled poisons are to be kept in a separate place under lock and key will entail upon the dispensing Chemist an amount of inconvenience which our readers will generally appreciate. It may be very proper

that some dangerous substances should be so kept, but by including in the list a variety of medicines which are in constant use, the closet or poison chest would be continually open, to the great alarm of the public if in the front shop, or the no less inconvenience of the dispenser if in a remote part of his premises.

While these theoretically conceived restrictions would impose upon the honest and suffering public an incalculable amount of inconvenience, the list of excepted poisons in Schedule B, and the proviso in sections 8 and 9—not to mention the innumerable catalogue of poisons to which the Act is inapplicable—would leave the criminal poisoner in full possession of all the facilities which he could desire for his purpose. The fact that poison certificates are in constant requisition by persons of all classes would remove suspicion in each case, and the notoriety of the various legitimate purposes for which poisons are daily used, would be a convenient cloak for the criminal, who might refer to the 11th section for a pretext, in case of need.

The natural result of such an Act of Parliament would be an extension of the public familiarity with poisons, and such familiarity would tend more to assist the criminal poisoner than it would to protect those who purchase poisons for legitimate purposes.

The impracticability of the angular and blue bottle scheme, as a regulation for universal adoption, has already been pointed out; and, even if it were practicable, it is simply an expedient for superseding the use of the senses, and enabling careless nurses to administer medicine without taking the trouble of reading the label. It would also give a fallacious confidence in the contents of round bottles, which, although they might not be included in Schedule A, would in many instances require quite as much care and accuracy in the use.

The form of certificate in Schedule C is signed by the vendor a "licensed Druggist." What is a licensed Druggist? By whom is he to be licensed? Does it mean Pharmaceutical Chemist, or is it in contemplation to empower the clergy or justices of the peace to grant the license to any huckster or oilman who may have a corner of his shop dedicated to Schedule A?

The responsibilities provided by the Bill are very severe. For the sale of any poison save as authorized by the Act—that is to say, without the required certificate, entry, signature, &c., or in a bottle of the wrong colour or shape, or without a label such as the Act describes; for failing to keep any poison under lock and key; or for any other infringement or evasion of the Act, the penalty is not exceeding £20 for the first offence, and £50 for any subsequent offence. *The person so convicted of any second or subsequent offence is to be for ever thereafter disabled from selling any poison, or carrying on the business of a Chemist and Druggist*; and a person so disabled is to be liable to a penalty of £50 if he should at any future time sell any preparation containing poison, or any drug or medicinal substance whatsoever!

If such an Act of Parliament should be passed, and not duly enforced, it would resolve itself into a Pharmacopœia for the instruction of criminal poisoners; if enforced strictly to the letter, every Chemist and Druggist in the kingdom might expect within twelve months to be legally "disabled" from carrying on the business, and the race would become extinct.

Whatever may be the fate of the Bill, its appearance as a literary curiosity will serve to demonstrate the extreme difficulty which attends legislation on this subject. Practical men were previously aware of the difficulty, and have never aimed at the utopian scheme of superseding the ordinary use of the senses by parliamentary precautions no less complicated than ingenious. To theoretical legislators, therefore, we are indebted for this effort of imagination, which, when submitted to the test of experience, will be found to be based on erroneous principles.

In reverting to the various cases of accidental poisoning which from time to time occur, and of which we have lately published a number of examples, it will

be observed that in a large proportion of the cases the accident may be attributed to the sale of poisons by incompetent persons, or to the neglect of some ordinary precaution, such as labelling the bottle or giving proper instructions as to the dose. In the Bill before us no allusion is made to the qualifications of the parties by whom poisons are to be sold, nor to the distinction which is now recognised by Act of Parliament between Pharmaceutical Chemists and unqualified persons who sell drugs by sufferance. The introduction of the term "licensed Druggist" shadows forth an imaginary distinction, which may be beneficial or injurious, according to the mode in which the idea is developed. The precautions proposed to be enforced are of that complex nature which it would be impossible universally to carry into practice, and every deviation from the supposed system of restriction would give rise to a fresh source of danger. For example, it is assumed in theory that a bottle of the right size and of the shape and colour defined by the Act, will always be at hand whenever any poison is to be sold, and that such bottles will not afterwards be used by the public for any other purpose. Practically it is well known that this will not be the case, and that consequently the precaution, if *relied upon*, would be worse than useless. The proposal to colour all poisons with indigo, soot, or archil, is too absurd to be seriously discussed in this Journal.

We have not attempted, on the present occasion, to criticize minutely the details of the Poison Bill, or to add anything material to the opinions which we have previously expressed as to the nature of the remedy which we consider best adapted to the object to be attained. The subject will shortly be discussed by the Council, and will also be brought under the notice of the Members at large, which will afford an opportuity for reducing into a practical form the result of the experience of those who are best acquainted with the subject.

The following extract from the article to which we have already alluded in the *Times* of May 22, directs attention to the most important and practical aspect of this question:—

"We place much reliance upon the gradual extension of scientific and general intelligence among the Druggists as a class, and regret that the trade cannot be brought under more stringent regulation, for no restraint of police or statutory check would be so efficient as that check and that restraint which educated Druggists would themselves supply. It is not absolutely necessary for the public convenience that deadly substances and drugs should be sold at every village shop, and we think some provision for confining the sale of such articles to properly accredited establishments might be introduced with advantage."

THE PRIVILEGES OF PHARMACEUTICAL CHEMISTS.

When a class of persons, after protracted efforts, have succeeded in obtaining a certain amount of advantage—whether it be position, influence, or substantial privileges—it is policy to continue to look forward and make the best use of the step already taken. While some of the parties concerned may be disappointed that greater progress has not been made, and others may be content to be spared any further trouble, those who are steadfast in the cause never lose sight of the original object of their ambition until their exertions have been rewarded by complete success.

The Pharmaceutical Chemists in this country have made a step in advance, and were never in a more favourable position for extending their sphere of usefulness, and rendering a service to the public, than at the present time. The House of Commons is paralysed by the mystification of Medical Bills; the House

of Lords is floundering among narcotics; the Press is uneasy on the subject; and the Public is more or less affected by the panic to which recent disclosures in parliamentary reports, sanitary commissions, and coroners' inquests have given rise.

Certain projects are under deliberation emanating from parties not practically conversant with the subject on which they have undertaken to legislate. The experience of the Pharmaceutical Chemist is required to solve the difficulties which have arisen, and to point out to what extent and in what manner a remedy may be most judiciously applied to meet the requirements of the case.

In coming forward under these circumstances to assist in the undertaking, the Pharmaceutical Chemists will, at the same time, confer a benefit on the public, and advance their own position and influence. No legislation on this subject can be effectual or consistent unless it recognises a qualification for dealing in poisonous medicinal substanes. It would be absurd to inflict a penalty of £10 for selling a quarter of an ounce of laudanum in a bottle of the wrong colour and shape, and at the same time to permit an illiterate apprentice in a huckster's shop to serve arsenic, nux vomica, arrowroot, oxalic acid, or Epsom salts, to any customer who may apply, even if provided with a certificate and a witness. The primary and most important question to be considered is—to whom should be entrusted the responsibility of selling and compounding those medicinal substances which are comprised in the list of poisons? It should be the policy of our members, whenever such questions arise, to come forward and take the position which the law has given them as the representatives of Pharmacy, claiming to be recognised in any Act of Parliament that may be passed with reference to the sale and dispensing of medicines, and offering such assistance as their experience may enable them to afford on the subject.

Some Members, however, instead of taking this course, appear to undervalue their privileges, and amuse themselves by scrutinizing the statistics of the Society, with a view of proving, if possible, that it is in a retrograde state. They deduce this inference from the fact that a few mushroom supporters, who came in at a moment of excitement a few years ago, evaporated like dew before the sun at the sight of the collector. But it is important to remember that the intelligent and influential Members remain, and that the moral and professional influence of the Society are daily increasing. It may be a question for serious consideration in what manner grocers, hucksters, and other incompetent persons are to be restricted in the sale of poisonous drugs, and whether any system of licence shall be adopted with reference to this branch of trade; but there can be no doubt as to the position and status of Pharmaceutical Chemists, who are at the present time acknowledged by law to be qualified, and who are the parties most capable of assisting the Legislature in the settlement of this question. An extension of the privileges of this class would conduce to the public benefit by inducing a larger number to qualify themselves, which would gradually increase the supply of trustworthy dispensers of medicine.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS (*continued*).

Bell, James .....Manchester	Parkinson, Robert .....Bradford
Bentley, Walter .....Brighton	Rowntree, Thomas.....London
Goode, Charles .....Congleton	Willows, John.....London
Hambrook, John Baker.....Dover	Williams, Thomas .....London
Hall, Robert .....London	

CONVERSAZIONE.

A Conversazione was held at the house of the Society on Tuesday evening, the 19th of May. Among the subjects provided for the entertainment of the company on this occasion, electricity and photography were most prominent. Very powerful galvanic batteries were used for showing the electric light and for charging the great electro-magnet, and a very powerful induction coil. A battery, consisting of eighty of Grove's cells was employed for the electric light, which was kept in operation, with a few intermissions, throughout the whole evening. A good deal of attention has been given to this subject lately by electricians, with a view to the construction of apparatus for rendering the light constant and uniform. Two of the instruments intended for this purpose were in use on the present occasion—one contrived by Mr. W. Squire, and the other, a modification of Mr. Squire's apparatus, by Messrs. Murray and Heath, of Piccadilly. Mr. Squire superintended the use of these instruments, and showed that the light can be maintained with very little variation, and only an occasional intermission, when it may be immediately restored by an attendant. A splendid beam of pure light was thrown from one of the windows of the house in different directions to a great distance, to prove its applicability for lighthouses and other similar purposes. The same battery that was used for the light was at intervals applied to the great electro-magnet, with which some of the results of the magnetic force were shown.

Other effects of electricity were exhibited in a darkened room, where a powerful Ruhmkorff's coil was used for giving to galvanic electricity a high degree of tension, resembling in this respect the electricity of the machine. The induction coil was kindly lent for the occasion by Mr. Gassiot, and the experiments were shown by Mr. Ladd. In this room experiments were also made by Messrs. J. L. and L. Wheeler, of Brixton, with their new gas-carbon battery, which is a modification of Grove's battery. This battery was described a short time ago at a meeting of the Chemical Society. The platinum plates of Grove's battery are replaced by plates of coal-gas carbon (the hard carbon which is deposited on the inner surface of coal-gas retorts). In this way the great expense of Grove's battery is avoided, while the power appears to be undiminished.

In connexion with the subject of electricity may be mentioned the magneto-electric step-by-step telegraph, which was exhibited by Mr. Siemens, of John Street, Adelphi. This instrument possesses the advantages of great simplicity, entire suppression of the battery, and capability of working through a great length of line-wire (having been worked through 3000 miles) without intermediate relays. It is intended chiefly for railway companies and private telegraphs, requiring only one line, and being always ready for work. The instrument called the indicator consists of two permanent magnets fixed to a frame, with the opposite poles turned towards each other, between which are placed the moveable poles of an electro-magnet. Positive and negative

currents passing in succession through the coils of the electro-magnet, cause a reciprocating motion of these poles, which are therefore successively attracted by the two permanent magnets. By this motion a needle is turned on a dial step by step, showing the different letters and signs. The electric current is produced through a second apparatus called an indicator, which consists of several permanent steel magnets, having one common anchor made of a soft iron core covered with insulated copper wire, and fixed so as to revolve in two bearings. This anchor is turned by means of a wheel and pinion through the crank fixed over a dial, showing the letters and signs corresponding with the indicator. By each half revolution of the anchor a current is produced alternately negative and positive, which passes through the coils of the indicator, moving the needle as mentioned above.

There were also specimens of all the submarine telegraph cables, which were contributed by Mr. Bentley.

Another application of electricity was exemplified by a series of very beautiful electrotype copies, in copper, of sculpture in *alto-relievo*. These, which are of French production, are some of the best specimens of the art we have seen. They were exhibited by Mr. Richard Knight.

The display of photographic pictures and stereoscopes comprised the productions of the most eminent artists in this department, including Mayall, Maul and Polyblank, Kilburn, Hughes, Williams, Knight, and others. From these sources were derived a large collection of portraits of eminent men, and pictures of all sorts. Messrs. Murray and Heath, Messrs. Horne, Thornthwaite, and Co., and Mr. Piggot also contributed to this part of the collection; and Mr. Olley contributed some well-executed micro-photographs.

Mr. Bower, of Tottenham Court Road, exhibited some specimens of *Glover's Patent Enamel Photographs*. The pictures taken by this process possess the advantage of having a white ground, and yet of being very translucent. They are stated to be more permanent than the ordinary photographs. The process is applicable to the production of painted windows, ornamental lamps, &c. The patentee also proposes the application of his process for manufacturing purposes. He says, "It can be applied to the production of clock and chronometer dials, watch dials, thermometers, barometers, compass faces, and tablets of *every description*, ensuring a degree of accuracy never yet attained by the engraver. They can be produced at less than one-third the cost of the materials at present in use for the above purposes, and far excel in appearance anything ever yet attempted. It cannot be injured by any length of time or atmospheric changes, and can be washed as an ordinary piece of porcelain. Another important consideration in the present invention is, that the printing of the photographs can be carried on by gaslight."

In addition to photographic pictures, there were a number of paintings in water-colour and in oil, which were supplied by Messrs. Vokins, and some beautiful figures, vases, &c., in porcelain, supplied by Mr. Sharpus.

The Master of the Mint contributed a case containing a complete collection of the war medals, the counterpart of one which was recently fitted up for her Majesty.

Among the apparatus exhibited, we may mention Knight's new soda-water apparatus, which was described in a recent number of this Journal. On the present occasion Mr. Knight had his apparatus in operation, and afforded to hundreds of the visitors a practical demonstration of the facility with which aërated waters may be made with it, and of the excellence of their quality.

There was a drawing of the new patented apparatus of Dr. Normandy, for the distillation of sea-water, and the production from it of good potable fresh water. This apparatus has been recently fitted up by the Government on the island of Heligoland. Also Normandy's steam-valve for equalizing the pressure of steam, as supplied from the boiler. Messrs. Elliot Brothers supplied some apparatus, including a small model hydraulic press, capable of exerting a pressure of sixty cwt.; Messrs. Horne and Thornthwaite, some sets of educational apparatus, such as are supplied at a very low price for the use of schools;

Mr. Griffin, a double action air-pump on Tait's principle, the barrel being placed horizontally beneath the plate; Mr. Rooff, charcoal and other respirators, and other apparatus; Messrs. Gwynne and Co., a patent barometer, of which the following is a description:—The instrument consists of an inverted glass syphon, sealed at one end and open at the other, partly filled with mercury, and suspended, so that the two limbs of the syphon form the arms of a balance. The invention consists chiefly in supporting or balancing the instrument on points, pivots, or knife-edges, or suspending it by a flexible material, as a silken cord, a fine flexible steel spring, &c., which allows the instrument to vibrate or oscillate freely, and a pointer or hand fixed to the instrument, and moving in front of an index or dial, shows by its motion the most minute change in the atmosphere. Any increase in the pressure of the atmosphere forces the mercury towards the sealed end of the tube, giving a preponderance to that side of the syphon, and, consequently, motion to the instrument; while a decrease in the pressure produces an effect in the opposite direction. A great many varieties in the arrangement of the instrument may be made.

Dr. Hofmann contributed a new form of combustion furnace for organic analysis, in which the heat is produced by the combustion of gas. Several arrangements have from time to time been suggested for this purpose, of which that exhibited on the present occasion is the most recent.

Among chemical and pharmaceutical products, and articles of Materia Medica, claiming notice on the score of novelty or superior quality, were the following:

A specimen of hydride of amyle, a new anæsthetic agent recently introduced by Dr. Simpson, of Edinburgh, from Messrs. T. and H. Smith, of Edinburgh. See page 604.

A specimen of pure benzine or benzole of English manufacture, and a solution of gutta percha in the same, from Mr. Bolton.

A new purple dye, obtained by the oxidation of aniline, together with specimens of silk dyed with it. This is the discovery of Mr. W. H. Perkin, of the Royal College of Chemistry, by whom it has been made the subject of a patent.

Paraffine candles, made from Irish peat, from Messrs. J. C. and J. Field.

Specimen of vanilla from the Mauritius, from M. de Valancé.

Chinese green dye, prepared from the stems of a species of rhamnus, and recently introduced into France, from Mr. D. Hanbury.

The fruit of St. Ignatius's bean, and a new variety of cassia fistula from South America, from Mr. Morson.

Fine crystals of sulphate of manganese, from Mr. Squire.

A fine specimen of sublimed chloride of chromium, from Mr. Braithwaite.

A specimen of the ordeal nut, and of a tincture of Montcenillier wood, used in Guinea for judicial poisoning, from Dr. J. H. Gladstone.

Specimens of dried plants and ferns were contributed by Mr. Bird; a collection of Australian plants by Mr. Sandford; and two branches of the olive-tree, one from the Mount of Olives and the other from Bethlehem, by Mr. Palmer.

SIXTEENTH ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 20th.

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

The President, in commencing the business of the Meeting, said that although there was nothing at the present time connected with the affairs of the Society to cause any great excitement amongst its Members, yet there was now quite as much reason for their taking interest in it, and using their energies in promoting the objects for which it was established, as on any previous occasion. It was true that at the commencement of an institution many difficulties had to be overcome relative to the mode of carrying out its objects, which gave rise to discussion and probably disagreements, causing much excitement among its Members, which might be compared to laying the foundation of a house where rocks and other obstructions required to be cleared away before building the walls of the edifice;

but when that was overcome, instead of expending their energies in disputes and arguments, they had an opportunity of bestowing them on the objects for which the Society was established. All were unanimous as to the advantages of associating themselves together for their mutual improvement, benefit, and protection, as well as for the protection of the public, and there could be no doubt as to the policy of keeping their shoulders to the wheel so as to take advantage of their past labours, and by a perseverance in the same course to overcome future difficulties. On looking over what had transpired during the past sixteen years, it appeared to him that they might gain some useful information for their future guidance. It was quite true that the Society was not precisely the institution first aimed at, because they originally contemplated obtaining some exclusive powers from Parliament, such as prohibiting all persons but Pharmaceutical Chemists from opening shops as Chemists and Druggists. To expect this to take place in their own time was probably expecting too much, as the ground on which they could deserve exclusive privileges must rest on qualifications which many of their body did not possess, and it was, therefore, necessary that a probationary period should exist, during their transition from their present state to that of a recognized, educated, and properly qualified profession. A very obvious preliminary step to be taken was to obtain the recognition of the Legislature, in the form of an honorary distinction; and having obtained this, it depended on themselves to substantiate their claim to further confidence, and an enlargement of the benefits which it was hoped would ultimately result to the profession and the public from the establishment of the Society. He often heard it asked, "*qui bono?*"—what advantages resulted from becoming Members of this Association; and his answer was, that the public were beginning to understand that a Pharmaceutical Chemist was more to be depended on than an ordinary Chemist and Druggist, and that consequently those who were Members of the Society were more likely to enjoy the confidence of the public and be patronised by them than non-members. Many young men appeared to be aware of this fact, and they took pains to qualify themselves to pass an examination, and in future none would be admitted to Membership but those who had qualified themselves accordingly. By that means they would attain indirectly that benefit for the public and their own professional character which they had been endeavouring to obtain by more direct means. To induce persons to undergo a voluntary examination it was necessary to make it as honourable a distinction as it could be; but it would have been improper and impolitic, in the first instance, to throw difficulties in the way of it by making it a very formidable ordeal. He was happy to say that the opportunities for qualifying had greatly increased, and the means of education now existed to any extent that pupils desired through the medium of this and other institutions. It had been suggested that the examinations in future might be made more complete by increasing the facilities for the practical part—such as dispensing prescriptions, spreading plaisters, and the other duties of the shop. These examinations had not hitherto, in this country, been carried out to the full extent, and consequently the objection occasionally made against them, that they were rather theoretical than practical, had been urged with some reason, from young men who had been able to answer chemical questions satisfactorily being found deficient in some of the manipulations behind the counter. The experiment, as far as it had been tried, led the Board to believe that these defects might easily be overcome, and that by making the examinations more complete and more practical the distinction would be considered more honourable, and this would increase the desire of young men to come up and obtain the diploma. He hoped the time would arrive when the examination would be conducted publicly in this country as in France, and the Members would thereby have an opportunity of judging for themselves as to the efficiency of the proceedings. In looking over the events that had occurred since the establishment of the Society, he had been constantly reminded of the great services of their late Secretary. He and Mr. Smith, with many zealous founders of the Society, had worked together even before its existence to devise some constitution for it, and to reduce its elements into a tangible form. It was impossible to overrate the zeal and energy which Mr. Smith had thrown into the work, and as the Society increased, his exertions and experience had grown with it, so that no one connected with the Institution was so conversant with the business as Mr. Smith. The Council were not conscious of the full value of his services until he was suddenly incapacitated by illness. It was only when they lost a valuable officer that they became fully aware of his worth, and the Council had found considerable difficulty,

from the correspondence and other work being in arrears consequent on his retirement. He (the President) took that opportunity of expressing regret at the delay and disappointment that must have occurred to some Members from the fact of the business of the Society having fallen into some unavoidable confusion during the interval following Mr. Smith's illness until the appointment of his successor. The Council were now getting the work into order, and by the efforts of their present Secretary they hoped soon to overcome the difficulty which the sudden loss of an officer who had grown with the Society had occasioned. He regretted that during the time of the greatest difficulties he was confined to his house by illness, which prevented his doing what he otherwise would, but, by the aid of Mr. Bird, who attended to the financial duties of the Society, and also the assistance of other Members of the Council, he hoped that the interests of the Society had not materially suffered during the interregnum to which he had alluded. He had only further to mention, that after the Report of the Council had been read, he would be happy to hear any suggestions Members might have to make. That was the only opportunity the Members had in the course of the year of meeting together to express in a public manner their approval or disapproval of the way in which the business of the Society had been conducted, and he wished them to take advantage of it. It sometimes happened that a fresh eye detected defects that might not have occurred to those who had gone in the beaten track of the past year. Whatever suggestions might be made by the Members would be received by the Council in the spirit in which they would be offered, viz., for the benefit of the Institution. The Chairman then called upon

The Secretary (Mr. BREMRIDGE) to read the

REPORT OF THE COUNCIL.

FINANCIAL STATEMENT—*From January 1st to December 31st, 1856.*

RECEIPTS.	£	s.	d.
Balance in Treasurer's Hands	333	2	0
5 Life Members' Fees ... 47 5 0			
Interest ... 33 13 10			
	80	18	10
Benevolent Fund:			
Subscriptions ... 46 6 0			
Interest ... 131 3 6			
	177	9	6
Government Securities, Interest ...	173	6	10
385 Town Members' Subscriptions ... 404 5 0			
1777 Country Members... 1860 12 0			
274 Associates ... 143 17 0			
226 Apprentices... 118 13 0			
	2527	7	0
Fees:			
15 Pharmaceutical Chemists ... 94 10 0			
26 Assistants ... 128 2 0			
64 Apprentices... 144 18 0			
	367	10	0
Arrears of Subscriptions ...	97	16	6
Lecture Fees...	22	1	0
Sale of Journals ...	4	14	6
Balance of Petty Cash due to Secretary ...	2	9	10
	£3786	16	0

EXPENDITURE.	£	s.	d.
Life Members' Fund Investment...	117	13	10
Benevolent Fund:			
Investment ... 111 7 9			
Gratuities ... 26 0 0			
	137	7	9
Invested in Government Securities	300	0	0
Repayments ...	0	10	6
Conversazione, Pharmaceutical Meetings, &c. ...	42	19	9
House Expenses ...	35	18	8
Rent, Rates, and Taxes...	297	15	6
Fixtures and Fittings ...	10	2	0
Apparatus ...	63	13	6
Postages ...	61	10	2
Stationery ...	13	2	3
Advertisements ...	15	7	0
Printing and Engraving ...	99	1	9
Collector's Commission...	29	11	3
Board of Examiners ...	33	12	0
Expenses of Society in Scotland ...	57	13	10
Travelling Expenses, Country Members of Council...	87	18	11
Salaries ...	300	0	0
Wages...	169	0	0
Journals...	662	10	0
Delivery of Journals ...	181	12	3
Library ...	19	5	0
Professor of Materia Medica and Botany, including duties as Curator in his department, and payment of Assistant ...	187	10	0
Professor of Chemistry and Pharmacy, including duties as Curator in his department, and payment of Assistant ...	225	0	0
Subscription to Royal Botanical Gardens ...	21	0	0
Solicitors' Costs ...	5	12	6
Balance in Treasurer's hands...	504	16	0
" in Secretary's ditto... 107 2 1			
Less Post-office Order out of date ... 0 10 6			
	106	11	7
	£3786	16	0

We, the undersigned Auditors, have examined the accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1856:

		£	s.	d.
On account of the General Fund	New 3 per Cents.	6345	4	8
Benevolent Fund.....	3 per Cent. Consols ...	4801	1	1
Life Members' Fund, 3 per Cent. Consols ...		1325	18	7
And at that date there was due to the Life Members' Fund.....		10	10	0

GEORGE S. PEDLER,
JOHN CARR,
WILLIAM BOWER,
ADOLPHUS FREDERICK HASELDEN,
ARTHUR BOWDLER HILL,
} *Auditors.*

3rd February, 1857.

Correct—S. T. COOPER, *Accountant.*

The foregoing Statement shows an excess of income over expenditure amounting to nearly £700; £417 13*s.* 10*d.* having been invested in Government securities, and the balance in the hands of the Treasurer and Secretary being larger by £274 15*s.* 9*d.* than it was at the end of the previous year. To ensure the permanent efficiency of the Society, it is necessary that a portion of the income should be regularly added to capital to compensate for the diminution which will result from the commutation of annual subscriptions of one guinea into fees and life subscriptions amounting to fifteen guineas, the interest of which latter sum payable by future Members, being about half the amount of the subscription which is annually paid by those who joined the Society prior to the date of the Act. It is also important that a fund should be raised for the purchase or erection of a permanent freehold building, better adapted to the requirements of the Society than the present house, which is held on lease for a limited term. The Members will observe with pleasure that the legal expenses are unimportant, as the duty of enforcing the Pharmacy Act is not attended with much expense.

Although the privileges conferred by the Act have been undervalued by some persons, the Council believe that the distinction is becoming more generally understood by the public, and that the confidence founded on that distinction will be found productive of substantial advantage to those who are registered as Pharmaceutical Chemists. With a view of promoting this object, and making generally known the nature and constitution of the Society and its prospective influence on the public welfare, the Council issued towards the end of last year a statement containing a brief notice of the origin and progress of the Society, and the mode in which it is calculated to raise the qualification of dispensers of medicine. This statement, which appeared in the November number of the Transactions, was published entire, or in substance, in most of the metropolitan and many local journals, with editorial comments generally satisfactory and encouraging. The increasing attention which has of late been given to the subject of adulteration both in food and medicines, and the notoriety of occasional accidents arising from ignorance, have tended to strengthen the hands of the Society as an institution established for the express purpose of correcting these deficiencies, and depending to a great extent on public favour for its success.

The growing demand for improved pharmaceutical qualification is shown by the regular influx of students at the School of Pharmacy in London, and in some other places where facilities exist for the study of Chemistry and the allied sciences. The lectures which are provided by the Society, and to which Members, Associates, and Registered Apprentices are admitted FREE, have been better attended during the present session than they have for many years past. An increase has also taken place in the number of pupils who have entered to the course of practical instruction in the Laboratory, and it is satisfactory to observe that this class has been steadily increasing during the last three years.

Since the session 1853-4, when the number of pupils in the laboratory was only twenty-one, the numbers in the three succeeding sessions have been respectively thirty, thirty-two, and thirty-eight. The last number relates to the present session, and represents the entries up to this time. The number of candidates who have passed the several examinations of the Society since the last anniversary, is as follows:—

The Classical Examination	79	Last year	59
The Minor Examination	41	"	46
The Major Examination	27	"	15

The Council have observed with much satisfaction the favourable progress of the Society in Scotland, a report of which appeared in the last number of the Journal. It is also gratifying to find that the local associations in Liverpool and elsewhere are in a thriving state, and are assisting the efforts of the Pharmaceutical Society in promoting education.

The Pharmacopœia Committee has continued during the past year to meet regularly, and has collected some practical information with reference to the Materia Medica. The several classes of preparations are under consideration *seriatim*, with a view of suggesting such amendments as experience may show to be desirable. In the draft of a Medical Bill recently introduced into Parliament, a provision was inserted for removing the duty of compiling the Pharmacopœia from the College of Physicians, and entrusting it to the "Medical Council of Health" proposed to be constituted under the Act, an arrangement to which the Council believe no objection is entertained by the College. The change, however, would not supersede the measures now in progress for an effectual revision and amendment of the Pharmacopœia, as the duty would in all probability continue in the same hands, although nominally placed under a different jurisdiction. Under any circumstances, the practical experience of the pharmaceutist is required in completing the details of this work, and the Society having been officially in communication with the College of Physicians on the subject, cannot escape from a share of the responsibility.

It is with feelings of sincere regret that the Council refer to the serious indisposition of the late Secretary, George Walter Smith, which has deprived the Society of the valuable services of a faithful, zealous, and efficient officer. The active exertions and energy of Mr. Smith at the time the Society was founded, contributed greatly to the success of the undertaking, and his methodical habits of business, regular attention to his duties, and the identification of himself with the welfare of the Institution from its establishment until the state of his health obliged him to retire, entitle him to the esteem and gratitude of the Members. There is every reason to believe that his over-exertion and anxiety on behalf of the Society occasioned a premature breaking-up of his constitution, and the Council consider that some substantial and permanent acknowledgment is due to him for this faithful service.

Mr. Peacock moved that the Report be received, and printed in the Transactions of the Society. He congratulated the Members on the progressive state of the Society, and observed that they had only to be true to themselves, and they would become as important a Society as any in the kingdom. He regreted to find that during the past year the Chemists had been attacked by the Medical Profession more than at any other period, and the occasions selected had been at inquests on the bodies of persons who had died from poison. Before the Medical Profession cried down the Chemists for selling poisons, he thought they should define them, and that the Legislature should name what should, and what should not, be sold without a medical certificate. The Chemists wished to be friends with the Medical Profession, and it was to be regretted that the latter attacked them without cause. He took leave to quote from an old number of the *Morning Advertiser* extracts from a letter on the subject, evidently intended as a defence of Chemists and Druggists, and as a general reply to the censures of Mr. Wakley and others, in reference to various accidents which had led to coroners' inquests. Much of the matter was

quite irrelevant, and the Meeting becoming very impatient at so much time being occupied by remarks of that nature from an anonymous newspaper correspondent, and on the speaker declaiming, "I could a tale unfold,"

Mr. WAUGH rose to order. He appealed to Mr. Peacock to have some consideration for the patience of the Meeting, having had ample time to unfold his tale. (He hoped Mr. Peacock would excuse the pun.) The Meeting had for a long time listened very patiently, but really the matter which had been introduced, and the personalities respecting the Medical Profession were so entirely foreign to the purpose for which they had met, that he hoped, for the credit of the Society, that these remarks would not be reported.

The Meeting appearing to concur in Mr. Waugh's observation, Mr. Peacock brought these remarks to a close. He inquired whether the Society had a paid librarian.

The CHAIRMAN said that the duties of librarian were combined with those of other officers. There was always some person who performed the duties, but no officer under the distinct designation of librarian.

Mr. GIBBS seconded the motion.

Mr. COLLINS said that the country Chemists found the Medical Profession their best friends. They were always ready to place confidence in the integrity of the Chemists, and he was not aware that they had been so severe as Mr. Peacock had stated.

Mr. SLIPPER said that he found by conducting his business so as not to tread on the heels of the Medical Profession, he obtained their approbation as well as that of the public. He repeated his suggestion of last year, that the Report of the Council should be printed, and circulated amongst the Members previously to the day of meeting, as was done by other public institutions. It was impossible for Members, from hearing the Report read, to retain the various points it touched on so as to be able to sift and ascertain if there were anything that required particular attention, or that was objectionable. He thought it practicable in these days of steam-printing that the Report might be in the hands of Members at least one week before the day of meeting. He considered it worth the attention of Members whether it should not be a *sine quâ non* that the Apprentices of Members should become registered Apprentices in connexion with the Society. He mentioned the subject from a belief that many Pharmaceutical Chemists, especially those in the country, took Apprentices without impressing on parents the necessity of their children becoming registered Apprentices. He concurred in the necessity of their making the examination practical as well as theoretical. In some of the hospitals it was found that those students who were best up in theory were the worst operators, and so it was sometimes with Chemists.

Mr. BURDEN thought some allusion would have been made in the Report to the intention of Parliament to interfere with the sale of poisons, and he called attention to Lord Campbell's recent remarks in the House of Lords relative to the necessity of some legislative enactment to curb the free-trade in these drugs. The Chemists had no wish to poison their neighbours, but he thought great difficulty must attend such legislation as that proposed, because it was well known that persons who destroyed themselves by poison contrived to obtain it for some professed legitimate object. It would be almost impossible for Chemists to take an attestation for every pennyworth of laudanum they sold; and he considered it was desirable that the Council of the Society should watch the matter, and if necessary interfere, so as to endeavour to modify any very stringent enactment that might be proposed relative to this subject.

The CHAIRMAN said it did not follow because the Council had not noticed the subject in the Report, that therefore they had paid no attention to it. He assured the Meeting, that should any such measure as that referred to be introduced into Parliament, it would be the duty of the Council fully to consider it, and give them due notice respecting its details, and, if needful, to call a Special Meeting. He had reason to believe that some legislation was intended on the subject, and whenever the draft of the bill was submitted to Parliament, it would receive the serious attention of the Council, and be communicated to the Members.

Mr. PEACOCK rose to explain some of his previous remarks, and disclaimed any intention of attacking the Medical Profession.

Mr. COLLINS hoped it was not the intention of the Council, as the Report appeared to indicate, to go on in the same hopeless spirit as in times past. He thought, as

there were several measures before Parliament relative to the medical profession, it was a good opportunity for the Council to endeavour to obtain the introduction of a clause into them beneficial to the Pharmaceutical Chemists. Whenever legislation took place in reference to the trade, it would be necessary to include all at the time in the profession, and the sooner they commenced, he thought, the better. It would be as well to correspond with the Medical Corporations on the subject, and in the event of their consenting to support the claim of the Pharmaceutical Chemists, they in return might be able to render them assistance, by the influence they might be able to bring on various Members of Parliament. He thought the object of the Society should be first to protect its Members, and then endeavour to induce Medical Practitioners to abandon Pharmacy. He moved, "That in the opinion of this meeting the influence of the Pharmaceutical Chemists of Great Britain would be wisely exercised in supporting the claims of Medical Practitioners to a legal recognition of their right to remuneration for professional service, and that the Council be respectfully requested to take such steps as in their judgment may best promote this object. That the Council be further requested to place themselves in communication with the Medical Corporations, with the view of obtaining their concurrence to the introduction of clauses in the Medical Bill, introduced to Parliament under their auspices, prohibiting the retail sale or compounding of medicines by any other persons than qualified Apothecaries or Pharmaceutical Chemists."

The Chairman stated that, having one Resolution before the Meeting, he could not take a second, unless as an amendment.

Mr. Collins therefore deferred his motion.

Mr. Waugh, on the part of the Council, said that it was intended the Report should be printed, so that a copy of it might have been put into the hands of every Member who entered the room that morning, but owing to some mistake it had not been done. He thought that, under all the circumstances, that would be the earliest period at which the Report could be circulated.

Mr. Mason also expressed an opinion that it was desirable that the Members should have an opportunity of reading the Report before they were called upon to approve of it. He regretted the loss of their late Secretary, and he considered that his services should be recognized by a resolution of the body. They had all received the utmost courtesy and kindness at Mr. Smith's hands. He called attention to the cost of the delivery of the Journals of the Society, which he said had increased during the past five years, whilst the number of Members had decreased during that time. He at first considered the difference arose from their being sent by post, but he found on calculating it that even then the expense ought not to have exceeded £133, so that there was a difference of £50, which he could not understand. He called attention to the late delivery of the Journal. He did not get his till the second of the month, though a country friend of his received a copy on the 31st.

(It was explained that the increase in the expense of the delivery arose from the endeavour from time to time to ensure greater punctuality, that a part of the expense was formerly included in the salary of the Secretary, and that in sending the Journals by post, other expenses besides postage were incurred.)

Mr. Dickinson suggested that the Report should be published at least a month before the day of Meeting.

The Chairman said it would be impossible. It was often found that up to the day of meeting some addition or amendment was necessary.

Mr. Garle observed that, as an improvement in the examination had been alluded to, he thought it desirable that the Board should give a first and second class certificate, which is the custom of some other examining bodies.

Mr. Bottle, after urging the necessity of an early circulation of the Report, regretted that it omitted all allusion to the four medical bills now before Parliament, in one of which there was a clause affecting the privileges of Chemists and Druggists. He thought it desirable that the Report should be circulated with the voting papers. He objected to the names of Candidates for the Council being introduced into the leading articles of the Journal, and asked in what relation that publication stood to the Society—whether it belonged to the Society or to the Editor. The remarks about the Country Members of Council were quite insulting. He thought it very desirable that Country Members should be elected on the Council; and he expressed an opinion that some alteration in the management of the Society was necessary, to give new life to it. He spoke of the Members of the Medical Profession

as the best friends of the trade. The Country Chemists most suffered from the huxters, and not from medical men supplying their own medicines. He was disappointed at not hearing the opinion of the Council expressed in the Report relative to the sale of poisons. If the Council wished to continue to receive the support of the Country Members, who stood now on the list as 6 to 1, they must do something towards protecting them from the infringements of the trade by grocers, who took away the bulk of the business. The words "Pharmaceutical Chemist" might do in London, but were not a sufficient protection in the Country. He complained of the omission in the accounts of a sum for prizes to students, and he objected to the large cash balance stated in the Report to be in the hands of the Secretary.

Mr. BIRD explained that it arose from the illness of the late Secretary.

Mr. PEDLER bore testimony to the great accuracy with which the accounts of the late Secretary were kept. He urged on the Members the necessity of their being united, if they wished to obtain the advantages for which the Society was originally established. He thought there was good ground on the part of the public for being alarmed at the dispensing of poisons. The most effectual way to remove it was to raise the status of the profession.

The CHAIRMAN, in reference to the remarks on the leading article of the Journal alluded to, said that he thought Members knew that the leading articles did not form any portion of the Transactions of the Society. The reason for mentioning the gentleman's name was, that he was one of the oldest Members, and had been slighted in being passed over on former occasions. It was his opinion that the attendance of country Members two, three, or four times a year at the Council Meetings was as much as could be expected of them, and the Members should recollect that the attendance of each every time involved a considerable expense. Some of the Meetings were merely routine Meetings, and the attendance of country Members might, on those occasions, be less important. The orders of the day were invariably sent to them, so that they might attend when subjects of importance required their presence.

After a desultory conversation, in which Messrs. Macfarlane, Hollier, Moore, Hooper, Bird, Edwards, Waugh, and Woolley took part, the resolution for the reception, &c., of the Report was unanimously agreed to.

Mr. COLLINS then moved his resolution, which was seconded by Mr. DICKINSON.

It gave rise to a protracted discussion, in the course of which there appeared to be a general feeling that it was undesirable to adopt such a resolution, and that the object aimed at might be better attained by leaving it to the Council. Ultimately the resolution was withdrawn, and the following substituted and carried *nem. con.*:—

"That this Meeting is of opinion that the Council should, during the ensuing year, watch Medical Legislation, with a view to protect the interests of Pharmaceutical Chemists."

Mr. BOTTLE moved—"That the annual Report be printed, and circulated with the voting papers."

The resolution, having been seconded, was put to the Meeting, and negatived.

The CHAIRMAN stated that he had in his hand a letter from a Member who was not able to attend (Mr. Tuff, of Enfield), who desired to call the attention of the Meeting to three subjects:—1st, The unfair operation of the Patent Medicine Licence; 2nd, The sale of medicines, poisons, &c., by grocers and others; 3rd, The propriety of claiming for Pharmaceutical Chemists exemption from serving on juries, when the public health might suffer from their absence. One of these subjects had been already discussed, the others must be reserved for a future opportunity, the time having expired.

Mr. PEDLER proposed, and Mr. BOTTLE seconded, a vote of thanks to the retiring Council, which was carried.

Twelve Scrutineers having been appointed, and thanks voted to the Chairman, the Meeting adjourned until Friday, the 22nd instant, at eleven o'clock.

ADJOURNED MEETING,
22*nd May*, 1857.

MR. JACOB BELL IN THE CHAIR.

Mr. CONSTANCE, the Chairman of the Scrutineers, presented the following Report:

We, the Scrutineers appointed at the Sixteenth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have duly examined the voting papers committed to us, and report the following results:—

COUNCIL.

Voting Papers allowed	822
" disallowed for informality	13
	835

Ballard.. 548	Edwards 745	Morson 785	Squire..... 684
Bird 737	Herring 442	Moore 521	Smeeton 482
Bucklee..... 729	Lea 446	Meggeson 677	Sandford 624
Davenport ... 725	Macfarlane ... 768	Peacock 536	Woolley..... 681
Deane 781			

AUDITORS.

Voting Papers allowed	785
" disallowed for informality	33
	818

Barnes..... 399	Carr 600	Hill 636	Pedler 601
Bower 515	Haselden..... 664	Palmer..... 432	

(Signed) EDWARD CONSTANCE, *Chairman* JOSEPH KETTLE
W. K. HOPKIN JOHN BARNARD
WILLIAM WINDLE CHARLES COLES
JOHN T. FENN W. H. BELL
NATHANIEL B. GIBBS GEORGE GALLIERS
THOMAS WILLIAMS JOHN T. TUPHOLME

The CHAIRMAN declared the COUNCIL and AUDITORS for the ensuing twelve months to consist of the following Members:—

COUNCIL.

BALLARD, EDWIN, Farringdon, Berks
BELL, JACOB, 338, Oxford Street
BIRD, WILLIAM LIONEL, 42, Castle Street, Oxford Street
BREW, THOMAS A., 71, East Street, Brighton
BUCKLEE, WILLIAM HENRY, 86, New Bond Street
DAVENPORT, JOHN THISTLEWOOD, 33, Great Russell St., Bloomsbury
DEANE, HENRY, Clapham
EDWARDS, JOHN B., 42, Berry Street, Liverpool
EDWARDS, GEORGE, Dartford
HANBURY, DANIEL BELL, Plough Court, Lombard Street
KEELING, GEORGE R., High Street, Epsom
MACFARLANE, JOHN F., 17, North Bridge, Edinburgh
MORSON, THOMAS N. R., 19, Southampton Row
MEGGESON, GEORGE, 64, Cannon Street, City
MOORE, JAMES LODGE, Craven Place, Paddington
PEACOCK, HAMERTON R., 170, High Street, Poplar
SANDFORD, GEORGE WEBB, 47, Piccadilly
SMITH, NATHANIEL, High Street, Cheltenham
SQUIRE, PETER, 277, Oxford Street
WAUGH, GEORGE, 177, Regent Street
WOOLLEY, JAMES, 69, Market Street, Manchester

AUDITORS.

BOWER, WILLIAM, 96, Tottenham Court Road
CARR, JOHN, 171, High Holborn
HASELDEN, ADOLPHUS F., 18, Conduit Street
HILL, ARTHUR, 11, Little Britain
PEDLER, GEORGE S., 199, Fleet Street

In answer to a question respecting the informalities referred to in the rejected votes, the Scrutineers stated that in some voting papers more than the proper number of names were left. Some of the Country Members had omitted to identify the envelope with name and address, as required by the bye-laws, and the votes of some London Members having been sent by post, could not be received.

The CHAIRMAN stated that, since the meeting on Wednesday, the substance of a

proposed Bill for regulating the sale of poisons had been published, and copies of the Bill would in the course of the day be sent to the Members of the Council. It was obviously impossible that such a Bill should pass, and it would be necessary for the Council to watch its progress.

The two Medical Bills were on the table, but the Chairman thought it needless at the present time to trouble the Members with any detailed remarks on the subject. The two Bills would tend to militate against each other, but neither of them appeared materially to affect the interests of Pharmaceutical Chemists.

Mr. BUCKLEE moved, and Mr. BIRD seconded, a vote of thanks to the Scrutineers, which, having been carried unanimously, was acknowledged by Mr. Constance.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, May* 13*th*, 1857.

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

DONATIONS of plants were announced from Mr. Ereaut, of Jersey, Mr. Medley, of Worcester, and Mr. Groves, of Weymouth.

An account of a botanical excursion to Lulworth, near Weymouth, by Mr. H. Groves, was then read, and illustrated by specimens.

The Committee have arranged that the botanical excursion shall take place on Saturday, the 27th of June. They propose that the Members should assemble at the Waterloo station and proceed by rail to Putney, from which place they would go across Wimbledon Common to Richmond. Any one wishing to join the excursion should communicate with the Secretary, Mr. C. Wood, 17, Bloomsbury Square.

As some of the Members wish to dine at Richmond, any Member desirous of joining the dinner should indicate the same to the Secretary before the 20th of June.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 23*rd April,* 1857.

MR. ABRAHAM, THE PRESIDENT, IN THE CHAIR.

MR. B. TOWNSON was elected a Member, and Mr. Booker an Associate of the Society.

The SECRETARY announced donations to the Library and Museum from Messrs. W. J. Blackburn, J. H. and S. Johnson, J. F. Grimsdale, A. Redford, T. D. Walker, H. S. Evans, J. Southward, the Royal Institution, and himself.

The CHAIRMAN then intimated that the next business was that which was announced in the circular:—

A REPORT ON THE GENERAL PROPERTIES OF THE RIVINGTON WATER.

BY J. B. NEVINS, M.D., AND J. B. EDWARDS, PH.D.

This was a subject of great interest, and immediate practical importance. It was one on which they ought to be able to afford useful information to their fellow-townsmen. It had been before discussed amongst them, and no doubt it would be again discussed with that philosophic calmness which distinguished their former debate. It had excited strong expressions; but he hoped on this occasion nothing that could give rise to unpleasant feeling would be indulged in, and that they should proceed, and be actuated by a love of truth. The two gentlemen who had prepared the report had paid very great attention to the subject; they had studied it laboriously, and no doubt would be able to give a good reason for all they stated.

Dr. EDWARDS then proceeded to read the report of the evening, an elaborate and lengthy document. He said that on the 15th of January last Mr. Mercer brought before the Members of the Chemists' Association specimens of the Rivington water, in small quantity, obtained by Mr. Alderman Bennett, and gave the result of a general chemical examination of the water, dwelling specially upon its action as a solvent upon metallic lead, and on the decomposition which he anticipated would

result from long storing on sea voyages, in consequence of the organic matter. These statements, and the comments made upon them, caused much anxiety in the public mind as to the wholesomeness of the supply which the subsequent pro-Pike and anti-Pike discussions by no means tended to allay. A proposal was therefore made to submit the water to certain eminent chemists in different localities, for scientific examination and report; but the expense of bringing such judges to the spot, and of employing them upon a long and elaborate inquiry, negatived the proposition. It then occurred to himself and Dr. Nevins that it became a public duty to come forward, and do to the best of their ability what was necessary to relieve the public mind on this subject, trusting that their offices would be accepted in good faith, their only desire being to serve the public. Acting, therefore, under a sense of this responsibility, they had endeavoured to steer clear from party bias, and to entertain this as a purely scientific question.

1st. Is the Rivington water in a condition fit for human consumption?

2ndly. If not, can it by any available means be made pure and wholesome?

Having obtained water from the various reservoirs at Rivington, from Prescot, and well-water from Green Lane, the authors proceeded to make their experiments. The quantity of water operated upon had been about twenty gallons, and had included, on several points, the present town supply, as well as various admixtures of the well-water with the Rivington in very various proportions. Having repeated the results of the experiments upon lead, as read before the Literary and Philosophical Society, Dr. Edwards went on to observe that the next experiments were made with a view to ascertain the keeping qualities of the water, and then noticed the colouring matter found in the Pike water. He said that publicity had recently been given in the Liverpool papers to experiments in the direction of galvanic action with a view to removing the colour, by Dr. Medlock, of London, and the results obtained by that gentleman had been adduced as applicable to the decolorization of the Rivington water. The process consisted simply of suspending a coil of iron wire in a reservoir of the Thames water. But surely it would be remembered that the Rivington water was in contact with iron by its line of pipes for twenty-five miles; and if so simple an agent was to decolorize it, we should already obtain it in this condition in the present reservoir. The organic matter in Thames water, it must be remembered, is largely of animal origin, hence the compound of nitrogen, viz., ammonia and nitrous acid which result from its decomposition. In the present instance the organic matter is purely vegetable in its origin; the theory and practice of Dr. Medlock did not, therefore, apply. Decolorization by means of animal charcoal was objected to on the ground of expense; but the reburning of animal charcoal by simple apparatus was now so readily applied, and so generally used, that the expense would not be large after the first outlay, while the character of the water would be greatly improved. It had lately been observed of the town supply of water that it was much harder than when the Rivington supply was first introduced, and that it now possessed neither the advantages of the well-water nor those qualities peculiar to the Rivington water. The authors had observed this change, and attributed it to an ineffectual attempt to decolorize the water by means of quicklime, which, while only partially successful in removing the colouring matter, materially increased the hardness of the water, and for many purposes injured its character. The authors entertained little doubt that, if experiments were instituted upon a sufficiently large scale, the colour might be effectually removed, without in the slightest degree injuring the best quality of water, namely, its softness. The authors concluded their paper thus:—The general conclusions to which we have arrived, as a result of these experiments, may be thus briefly stated.

1st. That the Rivington water, or any mixture containing it in equal proportions or thereabouts, will, when stored for twenty-four hours in a leaden cistern or tank, dissolve lead. Water thus impregnated is dangerous to the public health; and it is therefore necessary that, whenever leaden cisterns are employed, the metal should be protected by paint or some suitable cement. No danger results from the mere passage of the water through short lengths of leaden pipes.

2nd. That the Rivington water contains less germinating matter than the well-water from Green Lane, and when stored in either close or open vessels has preserved its sweetness during the six weeks over which our experiments have extended. Mixtures of Green Lane and Rivington water do not remain sweet for a lengthened period.

3rd. That the colouring matter may be, and ought to be, removed; and that, when thus properly filtered, the Rivington water is a wholesome and very excellent beverage, and calculated to be a great boon to the community.

4th. That the small amount of mineral ingredients it contains are of the most valuable character for dietetic and manufacturing purposes; and that the objectionable colour being removed, it has properties superior to well-water. Its insipidity is but the result of its purity and of the small proportion of carbonic acid which it contains. While, then, as a matter of taste and luxury, it may be desirable to retain a limited supply of well-water for the benefit of those who prefer it, the general public will be best served by a speedy and abundant supply from Rivington, free from any admixture whatever; and the question of a separate supply should be ascertained as one of public convenience rather than as one affecting the public health.

Dr. NEVINS stated that he had had considerable correspondence with medical men in those districts supplied with water of a similar description to that from Rivington. The towns to which he referred were Kendal, Lancaster, Bolton, and Sheffield. In Kendal, the report was, that for about two months, during the heat of summer, the water was so offensive that the people had to resort to the wells; but that the health of the town had improved since the supply of surface water, and that cases of lead poison were unknown. The reports which he had received from the other three towns were very similar; and so far as England was concerned, in regard to the effect on the health of the people, the answer was decidedly favourable.

The reading of the paper and Dr. Nevins's remarks were followed by considerable discussion, in which the Chairman, Mr. Mercer, Alderman Bennett, Dr. Collins, Mr. Mackinlay, and others, joined.

Thursday, 7th May, 1857.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. JOHN GLOVER, of Birkenhead, was elected a member.

The SECRETARY announced donations to the library from Mr. W. Wright and Mr. W. H. Samuel.

The CHAIRMAN called attention to a letter of Dr. Medlock, referring to the paper read by Drs. Edwards and Nevins at the last meeting.

Dr. EDWARDS said, that the question at issue was, could the colouring matter in the Rivington water be removed by means of iron? He had found that iron had some effect in destroying the vitality of the vegetable matter in the Rivington water, but does not remove it from solution, because, when heated, the water became more highly coloured than before, in consequence of the decomposition of the organic matter present.

Mr. G. R. BERRY then read the following paper:—

DRY COLLODION PROCESSES.

In the investigation of the dry collodion processes I propose to glance, first at the ordinary wet process, its manipulations and the chemical changes involved, and then to detail the different methods by which various experimenters have endeavoured to produce a dry collodion process, and at the outset I would mention that the more the whole subject of photography is investigated, the more palpable is the evidence that the ordinary laws of chemistry are capable of explaining all the phenomena observed in the different photographic processes, albeit our new science has revealed to us subtile chemical changes which our ordinary tests have failed to appreciate, illustrations of which will arise in the course of our subject this evening.

We will take first the ordinary collodion process, which is thus divided:

1. Preparation of the collodion.
2. Preparation of the nitrate of silver bath.
3. Preparation of the developing solution—positive and negative.
4. Removal of the surplus chemicals.
5. Varnishing.

Collodion is, as all are aware, a solution of one of the pyroxyline compounds, in a mixture of alcohol and ether, and holding also in solution an iodide, or a mixture of iodide and bromide of potassium, ammonium, cadmium, or other bases. The number

of these is not very extensive, as the case will admit only those soluble in the menstruum before mentioned, but if the ingredients are few in number the variations in quantity and relative adjustment are almost infinite, as every photographer has his series of pet fancies, and to this fact nearly all the disheartening failures of amateurs are attributable, and almost every instance of success has been attained by those who, adopting one formula, have adjusted their silver bath and developer in accordance; and, therefore, when the impressions fail to be successful, have only these three items to examine or replace. The silver bath varies in its strength from 20 to 60 grains per oz. of water, and it is on the proper reaction between the collodionized plate and the nitrate of silver in solution all success depends. The most approved formula for the silver bath for the negative and dry processes I believe to be the following:—

Nitrate of silver, that has been fused and probably containing a portion of nitrite . . . . . 1oz.

Dissolve in 4oz. water, to which must be added iodide of potassium . . 20grs.

This mixture must be well agitated at intervals for one hour. By this means the strong solution of nitrate of silver dissolves a portion of the precipitated iodide, and lets fall another portion on the addition of water to make up 14 fluid oz. The solution is then filtered and is ready for use. The collodion plates used will present an even primrose-coloured surface, without *striæ* or other markings, and the developed impressions will be clear and free from any irregularity of coating. The collodion process negative has, in itself, many advantages. Its great advantage is—exquisite sensibility, inasmuch as under favourable circumstances instantaneous impressions may be obtained; at the same time the delicacy of definition is all that can be desired, and if not equal to albumen, it is the fault in the preparation of the pyroxyline from which the collodion is made. It is facile in manipulation and speedy in its perfected results. Its disadvantage is the necessity of obtaining the impressions in the camera in the first few minutes from the excitation of the plate; it is therefore impossible to work far away from the dark closet or the tent in which the plates are prepared and developed. It is this that has prompted experimenters to devise some plan by which the sensitiveness of the plate might be indefinitely prolonged, and I lay before you the various plans proposed, in the order of their publication, as correctly as my means will allow.

If we excite a collodion plate in the usual way, and leave it in the dark slide until dry, we shall find that the nitrate of silver film, as it concentrates by evaporation, dissolves out the iodide from the collodion surface, and eventually crystallizes in minute stellar groups, completely destroying the utility of the surface as a photographic medium. The prevention of this result was the first problem to be solved if the plates were to be preserved any length of time after preparation. At first various plans were tried to prevent the evaporation altogether, as, for instance, laying a second glass plate directly upon the collodionized surface. Thus Messrs. Spiller and Crooks attempted the same object by steeping the prepared plate in a strong solution of a deliquescent nitrate. At first zinc, and subsequently magnesia, were employed. At a later period, Messrs. Shadbolt and Lyte partially washed off the excess of nitrate of silver from the plate, and poured over it a solution of honey, and I do not think there is, even now, a better process extant.

Simple oxymel, glycerine, treacle, and various other substances have also been employed. During this period the somewhat remarkable process of M. Taupenot was published, and was as follows:—The plate was first coated with collodion and sensitized in the usual way, the surface washed, and a mixture of albumen and honey slightly iodized was poured over it; it was then allowed to dry, and again plunged into the silver bath and rinsed, when it might be used, either wet or dry. The theory of the process, at the time it came out, was imperfectly understood; and, as it involved very operose manipulations, it was not so generally used as it deserved. The main point was the coating the excited collodion surface with the albumen, thus filling its pores and preserving it in some measure from the action of the air; and it being ascertained that even if the whole of the free nitrate were removed by washing, and the plate dried in the dark chamber, it was yet sensitive, although in an inferior degree than when recently prepared.

Mr. Barnes, who has been eminently successful upon dry plates, has published a pamphlet on the subject; contemporaneously, Dr. Hill Norris proposed to cover the washed plates with gelatine, and I believe his dried plates preserve their sensibility

for many months. I may add that Dr. Norris has patented his process, and that a company has been formed at Birmingham to sell the prepared plates.

Mr. Sparling employed a solution of dextrine mixed with honey, and iodized in the same way as Taupenot, also following him in two immersions in the silver bath.

Mr. Maxwell Lyte has yet more recently advocated the use of what he terms *meta-gelatine*, produced by boiling a solution of gelatine with sulphuric acid until it ceases to gelatinise on cooling, then removing the acid by digestion upon carbonate of lime, filtering, and adding a portion of clarified honey. This is poured over the plate, without previously washing, and stored away until required for use. This is certainly the quickest, and, as far as I have seen it tried, the most satisfactory process, as it may be used indifferently, either wet or dry.

One word more on the peculiarities of the meta-gelatine. While the Taupenot, Norris, and Sparling plates are hard and horny, the meta-gelatine is as it were porous, and to this I attribute the fact of the non-necessity of washing away the free nitrate, and from a series of experiments I have now in progress, I think I may safely say that before long I shall, by a modification, be enabled to dispense with the collodion altogether, and at the same time preserve the rapidity of action. This would, with large-sized plates, be a great pecuniary boon to photographers, as well as obviating the uncertain way in which collodion sets on large surfaces. Of course it is not to be expected that I shall divulge my mode of procedure until I have achieved my object.

The thanks of the meeting were unanimously awarded to Mr. Berry for his valuable paper.

ORIGINAL AND EXTRACTED ARTICLES.

HYDRIDE OF AMYLE.

BY T. AND H. SMITH, EDINBURGH.

In presenting a specimen of the new anæsthetic discovered by Professor Simpson, the hydride of amyle, and which we had the pleasure of preparing for him, it may not be out of place to make a few remarks regarding its history, chemical characters, and physical properties.

Dr. Frankland, Professor of Chemistry, Owen's College, Manchester, discovered it in the course of an investigation undertaken for another object. It had long been disputed whether ether and alcohol were mere hydrates of olefiant gas,

Olef. gas. Water. Ether.
$(C_4\ H_4) + HO = (C_4\ H_5\ O)$
Alcohol.
$(C_4\ H_4) + {}_2HO = (C_4\ H_6\ O_2)$

or whether they were constituted by the union of a compound radical ethyle ($C_4\ H_5$) with oxygen ($C_4\ H_5$) + O = ($C_4\ H_5\ O$) in the case of ether; alcohol being merely its hydrate ($C_4\ H_5\ O$) + HO = ($C_4\ H_6\ O_2$).

This last view had been advocated strongly by Liebig, although the very existence of organic radicals remained at that time entirely hypothetical; yet Liebig expressed his conviction that the ethyle radical ($C_4\ H_5$) would be obtained in a separate state.

Dr. Frankland, in entering on the interesting and able investigation of which the hydride of amyle was one of the fruits, was influenced by the desire of deciding this question by separating the radicals themselves, and more especially those of the different alcohols and their derivative ethers. The subject was undoubtedly a most difficult one, and required a clear head, profound chemical knowledge, and nice accuracy of manipulation.

Dr. Frankland began with wine alcohol, and unquestionably separated the radical ($C_4\ H_5$) ethyle, but which existed as a vapour even below the zero of F. He concluded, from the much higher equivalent of amylic alcohol ($C_{10}\ H_{12}\ O_2$) and the higher density of its vapour, that the radical amyle, if he should succeed in obtaining it, would exist as a liquid at ordinary temperatures, and thus give the means of ascertaining its nature more certainly, and also give a clue to a correct understanding of the character and functions of the compound radicals in general, and more especially of those which exist in the class of bodies called alcohols, on account of the great theoretical and practical interest belonging to them in a chemical point of view.

The method by which Dr. Frankland obtained and proved the existence of amyle, the radical of amylic alcohol, was to heat for several hours in an oil-bath iodide of amyle prepared from pure fusel oil by the simultaneous action of phosphorus and iodine on it,* in sealed glass tubes along with granulated zinc at a heat of 190° C. (374° F.), and then distilling off the products of decomposition. The first two-thirds came off at a heat of about 80° C., and the remaining third at about 160° C. (320° F.). The first distillate on rectification proved to be a liquid boiling at about 55° C. (95° F.), and on acting upon the liquid with anhydrous sulphuric acid, he separated a carbo-hydrogen polymeric with olefiant gas (C_{10} H_{10}), and on then distilling the part unacted on by the acid, he obtained a liquid having the composition (C_{10} H_{12}), with the very low boiling point of 30° C. or 86° F., which, in place of having an unpleasant odour and tar-like taste as the mixture had, possessed, on the contrary, a grateful fruity odour, and was tasteless.

This was the hydride of amyle, whose decided and energetic anæsthetic action Dr. Simpson has just discovered.

It is a clear colourless mobile liquid, and is the lightest fluid known, having the very low density of .638 at 57° F., and a vapour density of 2.5. It is very inflammable, and burns with a brilliant white and smokeless flame. It is insoluble in water, but readily soluble in alcohol and ether. It is a very stable compound, resisting the action of fuming sulphuric acid and the most powerful oxydising agents. Its rational formula is (C_{10} H_{11} + H), and therefore the hydride or hydruret of the radical amyle.

The liquid that was distilled last from the tube at a high heat proved to be the pure radical, and which had now been got in a separate form for the first time. This liquid is colourless and clear, of a density of .770, and boils at 155° C., or 311° F., and the density of its vapour is 4.9.

As Dr. Frankland found in his previous investigations for the discovery of the radical of wine alcohol, that on exposing the iodide of ethyle with an equal bulk of water along with zinc in sealed tubes to the action of heat, the only product was the hydride of ethyle, he was led to try the same process with the iodide of amyle, and the result of the use of water in the reaction was exactly analogous. Instead of a mixture of amylene, amyle and its hydride, he now obtained as the only product of decomposition the hydride of amyle, which distilled off at a very low heat, and after digesting the liquid for twenty-four hours with caustic potash, and redistilling at 35° C., or 95° F., was obtained quite pure.

He also found, that by the addition of water to the iodide and zinc, the decomposition easily took place at a heat of 140° C., or 285° F., whilst with the iodide and zinc alone a heat of 190° C. was required, besides the necessity of amalgamating the zinc.

On proceeding to prepare the hydride for Dr. Simpson, we very soon discovered the unsuitableness of sealed tubes, as used by Dr. Frankland, for its preparation in sufficient quantity to test its powers as an anæsthetic. We therefore got much larger tubes made, and carefully annealed, of one inch internal diameter, and $\frac{3}{16}$ of an inch thick; and instead of being sealed, which necessarily involved their destruction at each operation, we had them effectually closed by accurately ground stoppers, and these again strongly fixed down in their places by a metal bridle, with a binding screw. But from the enormous pressure, not less than 300 lbs., or twenty atmospheres, by calculation, to the inch, there was extreme difficulty in getting the stoppers perfectly tight. Seeing, however, superior advantages in this plan over the other, if the stopper could be made tight, we were induced to persevere, and at length, with great care in the grinding, succeeded in making an absolutely tight tube, even under such great pressure.

But from the great risk of explosion with such size tubes, we afterwards gave up the idea of glass ones altogether. One of these, after being exposed to the usual heat with a charge for more than an hour, burst into innumerable fragments with a tremendous explosion, breaking the thermometer and blowing out the sides of the

* The iodide of amyle is a colourless, transparent, heavy liquid; density 1.5. It is not readily decomposed, not changing colour even when kept for a long time in diffused daylight, although the direct rays of the sun decompose it easily. It mixes readily in all proportions with oils and ointments. In consequence of this, and the large quantity of iodine—two-thirds of its weight—which it holds in a perfect state of solution, it seems to us to be worthy of attention as an outward application, and all the more that the iodine is in the most favourable condition for being absorbed.

bath, whose scalding contents were scattered about in all directions, but fortunately without doing any personal injury. This occurrence proved the necessity of adopting another plan, and we therefore thought of a copper tube, which idea, however, was nearly put aside, under the fear of a strong galvanic action being induced, and interfering with the desired action: but, on reflection, such a result seemed to be of a favourable nature rather than otherwise, and we have now found that a copper tube answers admirably—and, in fact, part of what we made for Dr. Simpson was prepared in one.

A key to the explanation of the formation of the hydride of amyle is found in the tendency of the radical amyle to combine, not only with electro-negative, but also with electro-positive elements. Thus there are not only compounds like the following:—

Amyle.		Electro-negative elements.
$(C_{10} H_{11})$	+	O
$(C_{10} H_{11})$	+	Cl
$(C_{10} H_{11})$	+	Br
$(C_{10} H_{11})$	+	I;

but also—

		Electro-positive elements.
$(C_{10} H_{11})$	+	Z
$(C_{10} H_{11})$	+	H

Dr. Frankland succeeded in preparing both zinc methyle, zinc ethyle, and zinc amyle. These have all an intense attraction for oxygen. In the case of zinc methyle, it equals potassium in that respect; a small glass tube, containing only a few drops of the liquid zinc methyle, actually became red-hot on being placed under water, from the great intensity of the chemical action. The zinc ethyle is a liquid of 1.18 density, boiling at 118° C. or 244° F., and having a vapour density of 4.25.

All these metallo-organic bodies have such an attraction for oxygen that the most extraordinary precautions are necessary in preparing and distilling them, both to get quit of every trace of water, and to exclude the presence of air by replacing it either with an atmosphere of hydrogen, nitrogen, or carbonic acid.

The moment one of these metallo-organic compounds comes in contact with moisture, it is decomposed: the zinc takes the oxygen and the radical the hydrogen from an equivalent of water.

One of the methods of analysing it is indeed founded on this character: thus in the case of the amyle compound the action is as follows:—

$$\left.\begin{matrix}(C_{10} H_{11}) + Z \\ H\,O\end{matrix}\right\} = \left\{\begin{matrix}C_{10} H_{11} + H \\ Z\,O\end{matrix}\right.$$

And the production of hydride of amyle appears to be as here represented:—

$$\left.\begin{matrix}(C_{10} H_{11}) + I \\ H\,O \\ Z\,Z\end{matrix}\right\} = \left\{\begin{matrix}(C_{10} H_{11}) + H \\ Z\,I + Z\,O\end{matrix}\right.$$

Consequently, in distilling after the compulsive action of heat and great pressure, the hydride comes over, and there remains in the digester an oxyiodide of zinc.

In preparing the hydride of amyle the first step necessary is the purification of the crude fusel oil, which is a mixture of propylic ($C_6 H_8 O_2$), butylic ($C_8 H_{10} O_2$), and amylic alcohols ($C_{10} H_{12} O_2$), and of other alcohols much higher in the series; so that the boiling point, as we found, rises much higher than even 400° F. before the distillation comes to a close. As the boiling point rises from that of propylic alcohol (203° F.) to that of amylic alcohol (269° F.), it can hardly be doubted that the hydrides of the corresponding radicals would vary in their boiling points in at least an equal degree: and as the hydride of amyle has a boiling point of 86° F., there can be little question that the boiling points of the others lower in the series would be so low, that at ordinary temperatures they would exist only as vapours. Dr. Frankland accordingly found that the hydride of ethyle ($C_4 H_5$+H) still remained gaseous, even when submitted to twenty atmospheres of pressure.

A question here suggests itself to the mind: may not these hydrides, existing only in vapour at ordinary temperatures, be anæsthetics themselves, and if so, may their use as such be not an altogether impractical idea?*

* For instance, may not their saturated solution in alcohol, in which they are readily soluble, give a ready method of obtaining their use as anæsthetics?

From what is known of the volatile liquids got from wood and coal tars and bituminous minerals, these naturally suggest themselves as cheap and ready sources of the hydride of amyle, but from these it does not appear to us that it could be obtained in a sufficient state of purity as an anæsthetic, even though it may be found to form one of their ingredients.

Moreover, the difficulty of separating it from other ingredients, either by fractional distillation or otherwise, would be so great that success would be obtained at too costly a rate; and, after all, we fear the hydride of amyle would hardly fail to repel by the taint attaching to it from such sources.

With a view of getting quit of the expense of the iodine, which, however, can be recovered, we thought of trying the chloride in place of the iodide of amyle, but completely failed in getting the hydride from it, although the digester was subjected to the same heat as the iodide, and for double the time. On removing the preserve from the plug, after proper cooling, an escape of gas took place with a loud report, showing the presence of an uncondensable gas, most probably hydrogen; and on subjecting the contents to distillation, nothing came over till the heat reached the boiling point of the chloride, when nearly the whole of it distilled: besides, the zinc, instead of being matted together, as in the case of the iodide, by the formation of oxyiodide of zinc, was found in the tube quite loose.

In making the iodide of amyle, when the fusel oil has been nearly saturated with iodine, a solid crystalline matter separates, which becomes more abundant on the cooling of the liquid. So far as we have examined the compound, it seems to be a subiodide of phosphorus. It fumes strongly on exposure to the air, and on throwing it, after being firmly pressed in blotting paper into a glass tube containing water, a hissing like red-hot iron in water is produced, and on applying a light to the escaping gas, it takes fire and burns with a brilliant phosphorus flame, and gives abundant white fumes of phosphoric acid, and leaves a red crust of suboxide of phosphorus (?) on the mouth of the tube. The gas appears to be phosphuretted hydrogen. The water on examination was found to contain hydriodic and phosphoric acids. Heated in a test tube it melts at a low heat and boils, giving a sublimate, which condenses in crystals nearly colourless on the sides of the tube. On applying a light to it in the open air it takes fire, burning with a weak flame and the production of a violet coloured smoke. Further investigation into its nature has meanwhile been prevented by falling short of material.

REPORT OF THE
RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,
AND OF THE
APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D.

(*Continued from p.* 570.)

Extraction of Potash from Felspar and similar Minerals.—Prof. Fuchs observed some years since that when an intimate mixture of felspar and lime is ignited, the potash may be dissolved out of the mass by water, but it is necessary in this case to continue the washing for some time. Dr. Meyer,* of Berlin, has recently adopted the same means of rendering the potash soluble, and finds that its extraction is facilitated by digesting the ignited mass with water under a pressure of seven or eight atmospheres. After a short time the liquid becomes so alkaline that it does not contain any lime in solution. By this means he has extracted from felspar containing 13.56 per cent. potash and 0.36 soda, from 9 to 11 per cent. of alkali. He recommends using lime in the proportion of from 14 to 19 equivalents for one of felspar—or for 100 parts of felspar, 139 or 188 parts by weight of lime. Assuming that the alumina acts as an acid, there would be in such a mixture 3 or 4 equivalents of base to one of acid.

The lime may be used in the state either of hydrate or carbonate; it must be intimately mixed with the felspar, the mass rolled into balls three or four inches in diameter, gradually dried, and then kept at a bright red heat for several hours.

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* *Polytech. Journ.*, cxliii., 276.

When the burning has been properly conducted, the mass does not contain either carbonate of lime or caustic lime, and does not become hot with water. After burning, the mass is powdered and treated with water for two or four hours. A second treatment with water is not worth while. The felspar should be ignited and thrown into cold water in order to facilitate the powdering.

The insoluble residue is applicable for the preparation of a very superior kind of Portland cement, for when ignited again it hardens under water very rapidly.

Other minerals besides felspar may be used for this purpose; for instance, many kinds of granite containing 7 per cent. of potash.

Preparation of Iodide of Potassium.—The usual method of preparing iodide of potassium by precipitating periodide of iron with caustic or carbonated alkali, is open to several objections. Prof. Liebig* suggests, as an improvement on the method of preparing iodide of potassium, to dissolve one-third of the iodine in caustic alkali, and to precipitate the iodide of iron with this solution, so as not to introduce an excess of alkali. The pasty precipitate does not appear very uniform at first, but when the mixture is left at rest for some hours and shaken at intervals, a perfect combination of protoxide and peroxide takes place, and the whole of the iodide of potassium may be washed out readily.

Ferruginous Cement.—M. Chenot† prepares cement by mixing together clay or gypsum with spongy iron, obtained by reducing iron ore with hydrogen. Under the oxidizing influence of the atmosphere, the iron is converted into oxide, which is considerably more bulky than the metal, and consequently this change causes a considerable hardening of the cement. Addition of water, urine, ammonia, or vinegar accelerates the hardening very much.

Application of Town Refuse and Sewage for Agricultural Purposes.—Mr. Campbell brought this subject before the Fellows of the Chemical Society at a recent meeting. As the general question of sewage disposition is now being considered by a committee appointed for the purpose, Mr. Campbell confined himself to the consideration of those chemical facts which had a direct bearing upon the applicability of excremental material and town sewage as manure.

From a comparison of the results obtained by various observers, Mr. Lawes and Dr. Gilbert have computed that the quantity of fecal and urinary excretions voided daily by a single individual contains on the average 2 ounces of dry substance. Of this, one-fifth may be taken as equivalent to ammonia, another fifth as mineral substance, and the remaining three-fifths as organic substance. The agricultural value of excremental material is therefore to be sought in the two-fifths of dry solid, representing ammonia and mineral substances.

According to the "Analyses of the Ash of Feces and of Urine," published by Mr. Way in the Journal of the Royal Agricultural Society, the average quantity of phosphoric acid excreted daily by each individual is 30·4 grains.

The quantity of potash calculated from the same analyses amounts to 21·7 grains daily for each individual.

For a population of 10,000, therefore, the quantity of dry solid in the excrement yearly will amount to 205 tons, which would have a money value of £3075 sterling. This estimate is made upon the assumption that the ammonia in excremental material is worth £70 per ton; the phosphoric acid £56 per ton; and the potash £70 per ton.

The amount of these three substances was particularly referred to, because there is no question as to their agricultural value, provided they are to be procured in a condition available for the food of plants.

In the case of excremental material this circumstance seriously affects its value as manure. Thus, for instance, the quantity of water in fresh feces amounts, according to the analyses of Berzelius and others, to upwards of 70 per cent., while that in urine amounts to 93 per cent.

The value of solid and liquid excrement as manure has not only been pointed out by various chemists, but has long been recognized by agriculturists, for they had long been in use, both in this country and on the Continent, though without any attempt to manufacture them into a more portable and less objectionable form than they are

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* *Annalen der Chemie und Pharmacie*, c., 339.

† *Journ. de Pharm.*, Jan., 1857.

delivered by nature, until early in this century, when, in 1802, a M. Estienne proposed to gather the excrements into tanks, to allow the liquid part to run off, and to dry the residue in the sun, either alone or mixed with lime.

When this dry mass was stowed into sheds in heaps its temperature rose to 212 deg. Fah.; afterwards it was crushed into a powder, which is stated to have been devoid of all smell, and not very bulky. A few years afterwards Sir Humphrey Davy, in a lecture delivered to the Board of Agriculture, mentioned especially mixing quicklime with nightsoil, to deprive it of its disagreeable smell, and observed at the same time that the Chinese, whom he considered to possess more practical knowledge of the use and application of manures than any other nation, are in the habit of mixing their nightsoil with one-third of its weight of fat marl, make it into cakes, and dry it by exposure to the sun. "These cakes," Sir Humphrey adds, "we are informed by the French missionaries, have no disagreeable smell, and form a common article of commerce of the empire."

After these suggestions on disinfecting nightsoil, and depriving it of odour, no further progress appears to have been made until as late as 1835, when M. Pottevin noticed the value of carbon, as an adjunct to marl, for disinfecting substances, and obtained a patent for the preparation of a powder containing charcoal for this purpose.

After M. Estienne and M. Pottevin follow a number of other inventors, with methods which exhibit a more or less striking ignorance or disregard of the true principles of manuring, and of the real value of manure. Many of these methods, although patented, are identical; others are evidently useless for the purpose of producing manure of any agricultural value. Those which are most feasible consist in mixing with the excrement some absorbent substance, such as lime or charcoal; but as the value of manure depends upon the relation between the mass and the amount of particular constituents, the advantage of this plan cannot be great, because these substances have not such agricultural value as will admit of their transport to any great distance, and because the solid excrement to which they might be applied most efficaciously, as far as the production of a dry portable mass is concerned, is very much less valuable as manure than urine, and this would require such a large amount of lime or charcoal for that purpose as to be seriously reduced in value.

This constitutes the chief obstacle to the profitable use of excrement for agricultural purposes; for, although the gross amount of valuable substances contained in the excrement of even a small population may be very considerable, the separation of the large amount of water would be too costly to admit of being practically carried out, and the admixture of absorbent substances would decrease the value per ton, while it augmented the cost of transport.

Mr. Bridges Adams has, in a recent number of the *Engineer*, discussed the possibility of dealing with the excrement of the population of London without allowing it to pass into the sewers. He considers that if, by a mechanical arrangement of water-closets, the fæces and urine are collected apart, the latter may be barrelled up and very profitably transported by rail to agricultural districts.

He estimates the annual quantity of urine at 24,428 tons, but since urine contains 97 per cent. of water, and only 1 per cent. phosphoric acid and nitrogenous substance, equivalent to only 0.7 per cent. ammonia, it would be necessary to use about 30 tons, for the purpose of applying half a cwt. of ammonia to an acre. The cost of carriage for this quantity 20 miles beyond London would be about £2, whereas half a cwt. of ammonia can be bought for much less than £2, either as sulphate of ammonia or guano, and the cost of application to the land would be very considerably less than that of urine.

To dispose of the fæces, Mr. Adams suggests removal by carts from each house, and considers that it would be no difficult matter to distil them in gas retorts, to use the gas produced for lighting, and the residual charcoal as fuel. But Mr. Adams does not offer any suggestion as to the means by which, for this purpose, the fæces are to be dried and deprived of their water, amounting to more than 7-10ths by weight.

To compensate for the purification by water, Mr. Adams says: "In constructing closets without water the arrangement must be such as to separate the fluid from the solid by a diaphragm. To prevent a gaseous odour from arising two processes may be used—First, a chemical absorbent; and, secondly, an inch or two of fluid oil floating on the surface, through which both fluid and solid will pass, and be thus hermetically sealed. Probably a gallon of oil at about 3s. would be required once in

three months. In a family of twelve persons the total solid produce in three months would be about three feet. If made to fall into a cast-iron retort built into a furnace it would take scarcely any trouble, and only a few hours of a night, once in three months, to burn a few coals and utterly destroy it, burning the gas evolved at the same time."

It appears, therefore, very evident, from these facts, that Mr. Adams must have disregarded some important data in devising this very ingenious scheme.

However, under the system of sewers, which is now general in London, and which prevails more or less in most towns throughout this kingdom, the utilisation of excremental material in this manner is impossible, on account of the large proportion of water with which it is blended in its passage into the sewers; and the profitable use of nightsoil as a manure, either in the natural state, or prepared by any of the methods already described, will be restricted to the immediate neighbourhood of those places where water-closets are not in general use.

In town sewage, the chief element of manure value is the excremental material, and this, in the instance of London, with a population of 2,600,000, amounts annually to 53,393 tons of dry solid, which, as already shown, contains ingredients which give it a value of £15 per ton at least.

The quantity of ammonia NH_4O which this contains or is capable of producing is	11,440 tons
The phosphoric acid PO_5	1,839 "
And the potash KO	1,331 "

These three items make up a money value of about £836,834. In this estimate no account is taken of the suspended particles of animal substance, such as skin, hair, &c., which find their way into the sewers, from various sources, and which Mr. Campbell found to represent a quantity of ammonia nearly equal to 0·4 per cent. of the dry solid residue obtained by evaporating sewage water. In addition to these substances, the quantity of soda (NaO), calculated from the same data, and originating from excreta, amounts annually to upwards of 2000 tons.

It may be that materials of agricultural value flow into the sewers of London even at the present time from other sources; but as this would not be the case when the sanitary arrangements of the town shall have acquired a normal condition, no notice of such materials can be required for the present purpose.

The circumstances which operate in the opposite direction—viz., in reducing the value of the sewage for agricultural purposes, consist chiefly in the admixture of the water consumed for household purposes, for some manufacturing operations, and also the rain falling upon the area drained by the sewers.

The water supply being very unequal in different towns, the sewage will be proportionately different in concentration, and probably also in condition, since the sewage of towns where there is a copious supply of water issues from the mouths of the sewers for the most part fresh, while that of towns where the water supply is small, or the construction of the sewers defective, is always putrid, and contains the greater part of the nitrogen in the state of ammoniacal salts.

In all towns in Great Britain which are supplied by water companies, the consumption is, in round numbers, from 12 to 20 gallons daily for each individual, inclusive of wholesale consumers. The difference arises chiefly from the fact that in many places there are neither water-closets nor sewers.

	Gallons per head daily.
Ashton-under-Lyne	14
Duckinfield	12 to 14
Bury	
Brighton	20
Preston	20
Edinburgh	25
Liverpool	22
Manchester	25
Glasgow	50

Where the consumption per head is least, closets are used only by a few, and where the consumption is high, closets are almost universal.

In some towns in America the supply reaches as much as 100 gallons per head daily.

In 1854 the water supply of London averaged 20 gallons per head daily; at the

present time it amounts to 32 gallons per head, the total amount supplied by the metropolitan water companies being 81,000,000 gallons daily; in addition to this, about 11,000,000 gallons are obtained daily from the deep wells for brewing and other manufacturing purposes, a considerable amount of which ultimately passes into the sewers. Then there is the rainfall, which, on the average, amounts to about 25 gallons per head daily, so that the total amount of water disposed of in London amounts to 167,000,000 gallons daily, or 60,955,000,000 yearly.

Consequently, the 53,393 tons of excremental substance produced in the year will be distributed throughout a quantity of water which, in round numbers, may be fixed at 250,000,000 tons; and one ton of excremental substance, containing the constituents that have a money value of £15, will be distributed through a mass of liquid weighing 4682 tons. Herein is the great difficulty of dealing with the sewage for agricultural purposes.

The water itself will contain some substances of value as manure: Nitric acid, organic substance, alkalies, amounting on the average to 0.5 grain potash in the gallon, and to 1.0 grain soda NaO in the gallon.

(*To be continued.*)

ALUM IN BREAD.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I have read with some interest the two articles in the last number of the *Pharmaceutical Journal*, on the different modes of analysis for the detection of alum in bread; and, while agreeing with the authors on the main facts, I feel that the matter is left in an unsettled and unsatisfactory state. I therefore purpose, by your favouring me with the insertion of this in your next Journal, to advance the question a step further.

That alumina in small quantity cannot be precipitated in an organic fluid, such as an infusion of bread, I believe will be admitted. Therefore the only mode of detecting it is by combustion; but as it has been found that alumina does enter into the composition of some kinds of wheat, the presence of this substance is not conclusive of the presence of alum. It is consequently necessary to prove the presence of the other constituents of this salt in more than normal amount, and a certain and easy process I believe is a desideratum. The following, I think, will be found to fulfil this:—

Let the bread be soaked in distilled water, rather strongly acidulated with nitric acid, for twenty-four or thirty-six hours. Pour off the liquor, and press the residue, if thought necessary, and filter. Divide the filtrate into two portions, and evaporate one part to dryness, and incinerate the extract. The ash is to be examined for alumina in the usual way.

To the second portion of the filtrate, add ammonia in slight excess; boil and filter; acidulate this again with nitric or hydrochloric acid, and test for sulphuric acid. In some cases it will be advisable to concentrate this fluid before precipitation. The results by this method are clear and unambiguous. The same process is equally applicable to flour.

I cannot conclude this letter without expressing my opinion, in opposition to the editorial remarks, relative to the right or wrong of using alum in bread; and right or wrong it must be.

In the first place, it opens the door to fraud and unequal competition. That which is indifferent in quality, is made to resemble the best, and probably sold for it.

Secondly. Can it be said with truth that invalids and young children sustain no injury by the use of such bread? The healthy and strong may feel no immediate injury, but is it certain the seeds of disease are not sown?

Thirdly. If permitted by law, what is to be the amount, and who is to know when that is exceeded?

In conclusion, I think it almost as necessary that our bread should be as free from admixture as our medicines.

I am, Sir, your obedient servant,

Bradford, May 14, 1857. F. M. Rimmington.

[We disclaim any intention of sanctioning directly or indirectly the use of alum or any other substance prohibited by law as an ingredient in bread. If any observations in this Journal should have been supposed to admit of such construction, we regret the existence of any ambiguity, and take this opportunity of placing the question in its proper light. The effect of alum when used in the manufacture of bread—the *modus operandi* by which it improves the appearance of inferior flour—the chemical state of the alum in bread in which it has been so incorporated—and the comparative sanitary qualities of bread with and without alum—are questions of fact which constitute a very legitimate and useful field for scientific inquiry. Supposing it to be proved that the injurious effects of alum have been somewhat exaggerated, or that alum is decomposed and does not exist as alum in bread, or that the deleterious properties of the alum (if any) might be counteracted or diminished by any modification of the process—it would not follow, as a necessary deduction, that the law prohibiting the use of alum should be disregarded. Although the above and other similar propositions have been entertained, and to some extent supported on scientific authority, the *primâ facie* prejudice is against that view of the question. There is a natural objection to any chemical process which has the effect of giving a bad sovereign the appearance of a good one, and before such process could be generally received as justifiable it would be necessary to prove that the result is intrinsically for all practical purposes conducive to the public interest or benefit. The *onus probandi* rests upon those who affirm the proposition, and the pages of a scientific Journal are open to a free discussion of both sides of the question. We have already stated, and repeated it in our last number, that the subject requires further investigation, pending which we give no sanction to a violation of the law, and still retain a very strong bias in favour of bread without alum—whenever it can be obtained.—Ed. Pharm. Journ.]

PARCHMENT-PAPER.

At a meeting of the Royal Institution, held on Friday, the 3rd of April, the subject of the discourse delivered by the Rev. J. Barlow, Vice-President and Secretary to the Institution, was "*On some modifications of woody fibre and their applications,*" in the course of which an interesting description was given of the substance to which the name *Parchment-paper* has been applied. This substance is the invention of Mr. W. E. Gaine, C.E., by whom the process for its preparation has been patented. Mr. Barlow having described several of the applications of woody fibre, and particularly its application in the manufacture of paper, referred to the chemical and physical changes effected in paper and analogous fabrics by treating them with chemical agents. He contrasted with the pyroxylised textures of Kuhlmann and the gun-paper of Pelouze, the woven fabrics subjected to Mercer's process, and the *Parchment-paper*, the invention of Mr. Gaine. By acting on cloth with chloride of zinc, tin, or calcium, with sulphuric and arsenic acid, and, especially, by the caustic alkalies in the cold (the temperature sometimes being lowered to — 10° Fahr.), Mr. Mercer has obtained many important effects on the fineness and general appearance of cloth, and its susceptibility of dye. This subject was brought before the Royal Institution by Dr. Lyon Playfair, C.B.,* and it has since been closely investigated by Dr. Gladstone.† Mr. Mercer also experimented on the effect of acids on paper. It being known that sulphuric acid, under certain conditions, modified vegetable fibre, Mr. Gaine instituted a course of experiments to ascertain the exact strength of acid which would produce that effect on paper which he sought, as well as the time during which the paper should be subjected to its action.

* *Proceedings of the Royal Institution*, vol. i., p. 134 (1852).

† *Journal of the Chemical Society*, vol. v., p. 17 (1853).

He succeeded in discovering, that when paper is exposed to a mixture of two parts of concentrated sulphuric acid (*s. g.* 1.854, or thereabouts) with one part of water, for no longer time than is taken up in drawing it through the acid, it is immediately converted into a strong, tough, skin-like material. All traces of the sulphuric acid must be instantly removed by careful washing in water. If the strength of the acid much exceeds or falls short of these limits, the paper is either charred, or else converted into dextrine. The same conversion into dextrine also ensues, if the paper be allowed to remain for many minutes in the sulphuric acid after the change in its texture has been effected.

In a little more then than a second of time, a piece of porous and feeble unsized paper is thus converted into the *Parchment-paper*, a substance so strong, that a ring seven-eighths of an inch in width, and weighing no more than 23 grains, sustained 92 lbs.; a strip of parchment of the same dimensions supporting about 56 lbs. Though, like animal parchment, it absorbs water, water does not percolate through it. Though paper contracts in dimensions by this process of conversion into *Parchment-paper*, it receives no appreciable increase of weight, thus demonstrating that no sulphuric acid is either mechanically retained by it, or chemically combined with it. It has also been ascertained by analysis, that no trace of sulphur exists in the *Parchment-paper*. The fact of this paper retaining its chemical identity, constitutes an important distinction between it and the gun-papers of Pelouze and others. Unlike those substances, it is neither an electric, nor more combustible than unconverted paper of equal size and weight, nor soluble in ether or potash. Unlike common paper, it is not disintegrated by water; unlike common parchment, it is not decomposed by heat and moisture. In this remarkable operation, the action of the sulphuric acid may be classed among the phenomena ascribed to catalysis (or contact action). It is, however, conceivable that this acid does at first combine with the woody fibre, with or without the elimination of oxygen and hydrogen, as water; and that this compound is subsequently decomposed by the action of water in mass, during the washing process, the sulphuric acid being again replaced by an equivalent of water; for, as has been before stated, the weight of the paper remains the same before and after its conversion. Mr. Warren De la Rue and Dr. Müller are engaged in researches on this subject, which will be hereafter published.

Those who are interested in chemical inquiry will recal many instances of physical changes occurring in compound bodies, while these bodies retain the same elements in the same relative weights. The red iodide of mercury is readily converted by heat into its yellow modifications; yet, by the mere act of being rubbed, it is made to resume its former colour. Nothing is added to or taken from this substance in the course of these changes. The inert and permanent crystals of cyanuric acid are resolved by heat into cyanic acid—a volatile liquid, characterized by its pungent and penetrating odour, and so unstable that, soon after its preparation, it changes into a substance (cyamelide) which is solid, amorphous, and destitute of all acid properties. These substances, as well as fulminic acid (which, however, is known in combination only), contain carbon, nitrogen, oxygen, and hydrogen, in the same relative proportion. But the closest analogy to the production of *Parchment-paper*, scientifically considered, is perhaps afforded by what is called "the continuous process" in etherification. It will be remembered that, in this process, sulphuric acid, at a temperature of 284° Fah., converts an unlimited quantity of alcohol into ether and water. In the first stage of this process, as explained by Williamson, it would appear that the sulphuric acid combines with the elements of ether to form sulphovinic acid; and that, in the further progress of the operation, this compound, by coming into contact with a fresh equivalent of alcohol, is, in its turn, decomposed, and resolved into ether and sulphuric acid. The ether distils over together with the water resulting from the decomposition of the alcohol; the sulphuric acid remains in the retort, ready to act on the next portion. Here, as in the case of the *Parchment-paper*, the sulphuric acid does not form a permanent constituent of the resulting substance, though it takes so important a share in its production.

The strength of this new substance before alluded to, and its indestructibility by water, indicate many uses to which it may be applied. It will probably replace to some extent vellum in bookbinding; it will furnish material for legal documents, such as policies of insurance, scrip certificates, &c.; it will take the place of ordinary paper in school-books, and other books exposed to constant wear. Paper,

after having been printed either from the surface or in intaglio, is still capable of conversion by Mr. Gaine's method ; no part of the printed matter being obliterated by the process. *Parchment-paper* also promises to be of value for photographic purposes,* and also for artistic uses, in consequence of the manner in which it bears both oil and water-colour. It is about to be introduced into commerce by Messrs. Thomas de la Rue and Co.

ON THE SEA SAW-DUST OF THE PACIFIC.

BY JOHN DENIS MACDONALD, ESQ.,

Assistant Surgeon, R.N.

In this communication the author gives a description (illustrated by figures) of the remarkable little algal so frequently met with in the South Pacific, scattered over the surface of the water in broad streaks and patches of a pale yellowish-brown tint, and which is known under the name of "Sea Saw-dust."

After adverting to the occurrence of a similar phenomenon in other parts of the globe, and citing the account given of the *Trichodesmium erythræum* of the Red Sea by MM. Evernor Dupont and Montagne, together with a description extracted from the *Colombo Herald* of May 14, 1844, of what was obviously an example of a vegetable scum of the same kind occurring on the sea off Ceylon, the author remarks, that in the instances met with by himself he did not recognise the fœtid odour so generally and pointedly spoken of in the accounts of others. He then states results of his own observation as follows :—

"It was rather difficult at first to determine whether our species is to be referred to the Oscillatoridæ or the Confervidæ. In the latter, a linear series of tubular cells compose the filaments, which are thus said to be jointed, but in the former, although the filaments are tubular, simple and continuous without actual joints, a pseudo-jointed appearance is presented by the apposition of the little masses of contained colouring matter. Notwithstanding, having submitted the 'sea saw-dust' of the Pacific to microscopic examination on several occasions, I was much inclined to believe that the filaments were actually jointed ; and this view is supported by the circumstance that an empty tubule, or one in which the parietes may be traced continuously without being interrupted by joints or internal septa, has never fallen under our notice ; besides which the filaments are exceedingly brittle, usually suffering cleavage in the transverse direction. It, however, undoubtedly belongs to the Oscillatoridæ.

"When the filaments are first removed from the water, they may be observed adhering side by side in little bundles or fasciculi ; and besides the colouring matter, the little cells, or at least the intervals between the septa, contains globules of air, which sufficiently account for their buoyancy ; and, moreover, in this respect, although their abiding place is the open ocean, their habit can scarcely be regarded as very different from that of those species which flourish in damp localities exposed to the atmosphere.

"The filaments are all very short compared with their diameter, with rounded extremities ; and when immersed some little time in fluid so that the contained air-bubbles make their escape or are taken up, the pale colouring matter appears to fill the cells completely, and a central portion, a little darker than the rest, may be distinctly perceived in each compartment intersected by a very delicate transverse partition.

"We have found this species off the coast of Australia and in Moreton Bay, amongst the Polynesian Islands, and on two separate occasions off the Loyalty Group, in nearly the same geographical position."—*Proceedings of the Royal Society.*

ON THE EXISTENCE OF SILVER IN SEA-WATER.

BY FREDERICK FIELD, F.C.S.

In a paper first published by MM. Malaguti, Durocher, and Sarzeaud, in the *Annales de Chimie et de Physique*, xxviii., p. 129, and translated in the *Quarterly Journal of the Chemical Society*, vol. iii., p. 69, there is an account of the detection and estimation of silver in sea-water. The authors suspected the existence of the

* Photographs on this paper were exhibited.

metal from the extensive diffusion of silver in the mineral kingdom, the conversion of its sulphide into chloride by the prolonged action of soluble bodies containing chlorine, and the solubility of chloride of silver in chloride of sodium. The method pursued was by passing sulphuretted hydrogen through large quantities of water, and also by fusing the salts obtained by evaporation with litharge and subsequent cupellation.

As a solution of chloride of silver in chloride of sodium is instantly decomposed by metallic copper, chloride of copper being formed and silver precipitated, it appeared to me highly probable that the copper and the yellow metal used in sheathing the hulls of vessels must, after long exposure to sea-water, contain more silver than they did before having been exposed to its action, by decomposing chloride of silver in their passage through the sea, and depositing the metal on their surfaces. A large vessel, the Ana Guimaraens, now under the Chilian flag, was hauled down in the Bay of Herradura, near Coquimbo, for the purpose of being repaired, and the captain obligingly furnished me with a few ounces of the yellow metal from the bottom of the vessel. The investigation was interesting, as the metal had been on for more than seven years (an unusually long period), and the ship had been trading up and down the Pacific Ocean all that time. The metal, upon examination, was found to be exceedingly brittle, and could be broken between the fingers with great ease. 5000 grs. were dissolved in pure nitric acid, and the solution diluted; a few drops of hydrochloric acid were added, and the precipitate allowed to subside for three days. A large quantity of white insoluble matter had collected by that time at the bottom of the beaker. This was filtered off, dried, and fused with 100 grs. pure litharge and suitable proportions of bitartrate of potash and carbonate of soda, the ashes of the filter also being added. The resulting button of lead was subsequently cupelled, and yielded 2.01 grs. silver, or 1 lb. 1 oz. 2 dwt. 15 grs. troy per ton. This very large quantity could hardly be supposed to have existed in the original metal, as the value of the silver would be well worth the extraction. It is to be regretted that the captain had none of the original on board. A piece of yellow metal with which he was repairing the vessel yielded only 18 dwts. to the ton. I was enabled by the courtesy of the captain of the Nina, a brig which had just arrived in the Pacific from England, to obtain more satisfactory information. He gave me a piece of Muntz's yellow metal from his cabin, from the same lot with which the brig was sheathed, but which had never been in contact with salt water; and also a small portion from the hull of the ship after it had been on nearly three years. The experiments were performed as before, and the results were very striking:

grs.		grs.		oz.	dwts.	grs.	
1700 from cabin gave		.051=.003	per cent.=	0	19	14	per ton
1700 from hull	"	.400=.023	"	=7	13	1	"

That which had been exposed to the sea having nearly eight times as much silver as the original sample.

Many other specimens were examined of metals from the bottoms of ships, and of pieces which are always kept on board in case of need, and it was invariably found that the former contained more silver than the latter. For instance, a piece from the hull of the Bergmann gave 5 ozs. 16 dwts. 18 grs. per ton, while that from the cabin yielded 4 ozs. 6 dwts. 12 grs. 200 grs. from a piece from the hull of the Parga gave .072 grs., and a piece of fresh metal .050; while from the Grasmere, only coppered a few months, 610 grs. from the hull gave .075, and from the cabin .072—a very slight difference indeed.

It will be observed that the amount of silver in the above specimens of fresh metal is very high, and it is probable that most of these are merely the re-rolling of masses of metal melted down from old sheathing, and have derived the greater part of their silver from the sea on former occasions. It is well known that the copper used in the manufacture of yellow metal is very pure, containing 2 or 3 dwts. of silver per ton, frequently not so much, and silver is very seldom associated with the other constituent, zinc. In order to arrive at more certain results, however, I have granulated some very pure copper, reserving some in a glass-stoppered bottle, and suspended the reminder (about 10 ounces) in a wooden box, perforated on all sides, a few feet under the surface of the Pacific Ocean. When occasion offers, the box is towed by a line at the stern of a vessel which is trading up and down the coast of Chili. It is almost too soon to expect any decisive results at present, but in a few months I hope to be enabled to send both the original copper and that which has been exposed to the action of the sea.—*Proceedings of the Royal Society.*

SALE OF POISONS, &c., BILL.

ARRANGEMENT OF CLAUSES.

COMMENCEMENT of Act, sect. 1. 14 and 15 Vict., c. 13, repealed, 2. Definition of poison, 3. Other substances and preparations may be added by order in Council to those in the schedules, 4. Poison to be sold only to a person of full age in presence of a witness of full age, and upon the production of a certificate, 5. Entries to be made regarding the sale of poisons, 6. All poisons, &c., sold, to have proper coverings, to be distinctly labelled, with address of vendor, and the word "Poison" to be moulded on the bottle, 7. Colourless solid poisons sold must be mixed with soot or indigo, 8. Colourless liquid poisons must be coloured by archil, 9. Gift of poisons to be subject to the provisions applicable to sales, 10. Prescriptions of medical men and sales by wholesale or for lawful use in trade or occupation exempted, 11. Poisons to be distinctly labelled and kept apart in the shop or dispensary. Poisonous medicines for external use to be put in coloured bottles of a peculiar shape, 12. Penalty for offending against the Act, 13. Schedules.

A BILL INTITULED AN ACT TO RESTRICT AND REGULATE THE SALE OF POISONS.

Whereas the existing restrictions on the sale of arsenic have been found to be insufficient, and the unrestricted sale of other poisons facilitates the commission of crime, and occasions frequent fatal accidents: Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

I. Save where herein otherwise provided, this Act shall commence and take effect from and after the day of One thousand eight hundred and fifty-seven.

II. The Act of the session holden in the fourteenth and fifteenth years of Her Majesty, chapter thirteen, "to regulate the sale of arsenic," shall be repealed.

III. In the construction of this Act the word "Poison" shall mean any drug or substance mentioned or referred to in the schedule (A) to this Act, and also any compound, preparation, or mixture containing any such drug or substance, except only such compounds, preparations, or mixtures as are specified in the schedule (B) to this Act.

IV. Provided, that in case it appear to Her Majesty in Council that the unrestricted sale of any drug or substance not mentioned in the schedule (A) to this Act should be subject to the restrictions of this Act, it shall be lawful for Her Majesty, with the advice of her Privy Council, to order that such drug or substance shall be subject to the provisions of this Act concerning poison ; and in case it appear to Her Majesty in Council that the sale of any compound, preparation, or mixture containing any drug or substance, being poison within the meaning of this Act, may be safely exempted from the restrictions of this Act, it shall be lawful for Her Majesty, with such advice as aforesaid, to order that such compound, preparation, or mixture shall be exempted from the provisions of this Act applicable to poison ; and every order in Council made under this provision shall be published in the *London Gazette ;* and upon the expiration of one month after the publication of such order, unless a later time be mentioned in such order, and in that case after the time so mentioned, the drug or substance thereby declared subject to the provisions of this Act concerning poison shall for all the purposes of this Act be deemed poison, as if it had been mentioned or referred to in the schedule (A) to this Act ; and any compound, preparation, or mixture declared by such order to be excepted from the provisions of this Act concerning poison, shall be so excepted accordingly, as if it had been specified in the schedule (B) to this Act.

V. No person shall sell any poison, on any pretence whatsoever, unless the sale be made to a person of full age, and in the presence of a witness of full age, who is known to the person selling the poison, and to whom the purchaser is known, and unless there be produced and delivered to the seller, before such sale, a written certificate, signed by the clergyman of the parish or district, or a legally qualified medical practitioner, or a justice of the peace acting for the county or place, and dated, stating that the person giving such certificate knows the applicant, and believes that the poison may be safely supplied to him, and is to be used for the purpose of his trade, or for some other lawful purpose to be mentioned in such certificate, and all such certificates shall be carefully preserved by the seller in the order in which they are received.

VI. Every person who sells any poison shall forthwith, and before the delivery of the same, enter or cause to be entered, in a fair and regular manner, in a book or books to be kept for such purpose, in the form set forth in the schedule (C) to this Act, or to the like effect, a statement of such sale, and the following particulars :—

1. The date of the sale and delivery of such poison:
2. The name and surname of the purchaser:
3. His place of abode, condition, or occupation:
4. The name and quantity of the poison sold:
5. The purpose for which such poison is stated to be required:
6. The name and condition of the person giving the certificate for such purchase with the date of such certificate.

Into all of which circumstances the person selling such poison is hereby required and authorized to inquire of the purchaser before the delivery of the poison; and such entries shall in every case be signed by the person making the same, and shall also be signed by the purchaser and by the witness, who shall add his place of abode.

VII. No poison sold shall be wrapped in paper only without a covering of tinfoil, and all poison sold shall have the bottle, or other vessel, box, wrapper, or cover (as the case may be), containing such poison, distinctly labelled in conspicuous capital letters, white on a black ground, with the word "POISON," and with the name and surname and address of the person selling such poison, and every bottle containing any such poison shall have the word "POISON" cast or moulded in raised letters on four sides of the bottle.

VIII. No person shall sell any colourless poison whatsoever in a solid state, unless the same be before the sale thereof mixed with soot or indigo in the proportion of one part by weight of soot at the least to fifteen parts by weight of the poison, or of one part by weight of powdered indigo at the least to thirty-one parts by weight of the poison, save where such poison is stated in the certificate to be required for some lawful purpose for which such admixture would, according to the representation of the person giving the certificate, render it unfit, and in that case such poison may be sold without such admixture in quantities of not less than half a pound.

IX. No person shall sell any colourless poison whatsoever in a liquid state, unless the same be before the sale thereof mixed with such a quantity of a strong solution of archil, not being less than ten minims by measure to one fluid ounce of the poison, as will give the fluid a decided colour, save where the poison is stated in the certificate to be required for some purpose for which such admixture would, according to the representation of the person giving the certificate, render it unfit, in which case such poison may be sold without such admixture.

X. If any poison be given or delivered (whether gratuitously or in exchange for any other article or thing) by any person whatsoever to any other person, such gift or delivery shall for the purposes of this Act be deemed a sale, and all the provisions and penalties of this Act applicable to a sale of poison shall apply to such gift and delivery, and for the purposes of this Act the person giving or delivering the poison shall be deemed the seller, and the person to whom the same is given or delivered shall be deemed the purchaser.

XI. The provisions hereinbefore contained shall not extend to the sale of any medicine required to be made up or compounded according to the prescription of a legally qualified medical practitioner, or made up or compounded by a legally qualified medical practitioner, or to the sale of poisons by wholesale to retail dealers, or legally qualified medical practitioners, upon orders in writing, in the ordinary course of wholesale dealing, or by wholesale or retail to Manufacturing or Analytical Chemists, or by or to persons carrying on the trade or business of painters, manufacturers of, and dealers in colours, artists' colourmen, glass or shot manufacturers, veterinary surgeons, dyers, paperstainers, electro-platers, photographers, braziers, whitesmiths, bird-stuffers, or firework makers, provided the poison is stated to be required and may be reasonably believed to be required for the ordinary purposes of trade or lawful occupation, and not for any other purpose whatsoever.

XII. And whereas it is expedient that as well members of the medical profession as others should be subject to regulations in respect of the keeping of poisons and the delivery of poisonous preparations intended for external use :

Every person who keeps for sale by retail any poison, and every Apothecary, Surgeon Apothecary, or other member of the medical profession, and every officer of any hospital infirmary, or dispensary, who has under his custody any poisons, shall keep all such poisons separated from all other drugs and medicines, and dis-

tinctly labelled with their proper English names, in a closet set apart for this purpose, under lock and key:

All liquid medicines intended for external use, and consisting of or containing any poison, shall be sold and delivered in bottles of blue coloured glass, and of a quadrangular shape, and labelled in conspicuous capital letters, white on a black ground, "POISON," or "FOR EXTERNAL USE;" the word "POISON," or the words "FOR EXTERNAL USE," being also cast or moulded in raised letters in the glass on the four sides of the bottle.

XIII. If any person sell any poison, save as authorized by this Act;

Or deliver the same, without having made and signed the entries hereby required on such sale, or without having obtained such signatures to such entries as are required by this Act, or without complying with all the provisions of this Act in relation to the sale of such poison;

Or if any person purchasing any poison give false information to the person selling the same in relation to the particulars which such last-mentioned person is hereby authorized to inquire into of such purchaser, or procure, by a false certificate or other false pretence, such poison, or procure by false pretences a certificate for the purchase of poison from any clergyman, medical practitioner, or justice of the peace;

Or if any person sign his name as aforesaid as a witness to a sale of poison to a person unknown to the person so signing as a witness;

Or if any person hereby required to keep any poison under lock and key as hereinbefore mentioned fail so to keep such poison at all times, except when actually selling, dispensing, or lawfully using such poison;

Or if any person sell or deliver any liquid intended for external use, and containing any poison, otherwise than in such a bottle of coloured glass as aforesaid, and labelled as aforesaid;

Every person so offending shall for every such offence, upon a summary conviction of the same before two justices of the peace in England or Ireland, or before two justices of the peace or the sheriff in Scotland, be liable to a penalty not exceeding twenty pounds for the first offence, and to a penalty not exceeding fifty pounds for the second, or any subsequent offence;

And the person so convicted of such second or subsequent offence shall be for ever thereafter disabled from selling any poison, or carrying on the business of a Chemist and Druggist; and if such person so disabled sell to any person, or in any manner whatsoever, any poison, or any compound, preparation, or mixture containing any poison, or carry on the business of a Chemist and Druggist, or sell any drug or medicinal substance whatsoever, every person so offending shall for every such offence, upon a summary conviction of the same before two justices of the peace in England or Ireland, or before two justices of the peace or the sheriff in Scotland, be liable to a penalty not exceeding fifty pounds.

Schedules to which the Act refers.

SCHEDULE (A).

Arsenic and its compounds. Corrosive sublimate and its compounds. The poisonous vegetable alkaloids. Prussic acid. Cyanides of potassium, mercury, and silver. Chlorides of zinc and antimony. Essential oil of bitter almonds, and any mixture containing it. Cantharides and its preparations. Belladonna and its preparations. Hemlock and its preparations. Aconite and its preparations. Opium in tincture, extract, and powder. Foxglove and its preparations. Stramonium and its preparations. Chloroform and its compounds. Oxalic acid and binoxalate of potash. Nux vomica seeds and bark. Tartarized antimony and its solution. Cocculus indicus. Ergot of rye. Savin. Lobelia. And all liquids or solids containing or consisting wholly or in part of the above-mentioned poisons, poisonous drugs and herbs.

SCHEDULE (B).

The under-mentioned compounds, prepared according to the directions of the Pharmacopœias of London, Edinburgh, and Dublin, or any of them:—Sulphuric, nitric, and muriatic acids, diluted according to the formulæ of the British Pharmacopœias, or with a larger proportion of water. Cerate, ointment, and plaster of cantharides, blistering cloth. Plaster and ointment of belladonna. Compound pill of hemlock of the London Pharmacopœia. Compound pill of soap of the London and Dublin Pharmacopœias. Pill of calomel and opium (Edinburgh Pharmacopœias). Pill of lead and opium (Edinburgh Pharmacopœia). Compound powder of chalk with opium (London Pharmacopœia). Electuary of opium (Edinburgh Pharmacopœia). Confection of opium (London Pharmacopœia). Plaster of opium (London, Edinburgh, and Dublin Pharmacopœias). Liniment of opium (London and Edinburgh Pharmacopœias). Ammoniated tincture of opium (Edinburgh Pharmacopœia). Ointment of opium (London Pharmacopœia).

Compound ointment of the gall nut (London and Edinburgh Pharmacopœias). Compound pill of storax (London and Edinburgh Pharmacopœias). Compound powder of ipecacuanha (London, Edinburgh, and Dublin Pharmacopœias). Pill of ipecacuanha and opium (Edinburgh Pharmacopœia). Compound powder of kino (London Pharmacopœia). Electuary of catechu (Edinburgh Pharmacopœia). Pill of foxglove and squills (Edinburgh Pharmacopœia). Ointment of tartarized antimony (London, Edinburgh, and Dublin Pharmacopœias). Savin ointment (London Edinburgh, and Dublin Pharmacopœias).

SCHEDULE (C).

Date of Sale and Delivery.	Name and Surname of Purchaser.	Purchaser's Place of Abode and Occupation.	Name and Quantity of Poison sold.	Purpose for which required.	Name of Person giving Certificate.
Saturday, Sept. 26, 1856. 10 30 A.M.	*Henry Holmes*	*27, Snow's Fields, Bermondsey, Shoemaker.*	*Arsenic ½ lb. Coloured Blue with Indigo.*	*For destroying Rats and Mice.*	*James Paget, Incumbent of St. Olave's, Bermondsey.*

(*Signature of Purchaser.*)
HENRY HOLMES.

(*Signature of Witness.*)
JOHN SIMS,
26, Tooley Street,
Southwark.

(*Signature of Vendor.*)
SAMUEL EDWARDS,
Licenced Druggist,
18, King Street,
Southwark. }*

PHARMACEUTICAL SOCIETY, VICTORIA.

A MEETING of the principal Chemists and Druggists of the city took place at the Mechanics' Institution on Friday evening, March 6, for the purpose of establishing a Pharmaceutical Society for Victoria, of a similar character to the one founded many years ago in Great Britain.

The Hon. J. Hood, M.L.C., was called to the chair, and briefly stated the objects of the meeting.

The secretary, Mr. Williams, read several communications, and the following report:

Report of the Committee appointed at a meeting of Chemists and Druggists, held at the house of Mr. Croad, Bourke-street, on the 16th ultimo:

In consequence of the various attempts that have been made of late to interfere, by legislative enactment and otherwise, with the Chemists and Druggists of this colony, it has been thought by many of the principal members of the trade in and around Melbourne and Geelong that an organisation should be instituted, for the purpose of protecting the trade generally, and also of elevating its character and position.

These ideas were, however, allowed to slumber until Dr. Tierney brought into the Legislative Council his "Poisons Bill," for the regulation of the sale and the safe keeping of all poisonous and deleterious drugs.

On the appearance of this bill the trade felt justly indignant that a measure likely to affect their interest so materially should have been introduced without any consultation, and accordingly met in considerable numbers at the house of Mr. Croad, and determined at once to send in a petition against the passing of such a crude and unnecessary measure. The petition was accordingly prepared and signed by every member of the trade in and around Melbourne and Geelong, and placed in the hands of the Hon. J. Hood, M.L.C., for presentation to the Council. A second meeting was held at the same place on the 16th ultimo, when your committee was appointed, consisting of Messrs. Croad, Williams, Blackett, Ford, Bosisto, Walton, Glover, and Lewis, for the purpose of waiting upon the members of the Legislative Council, and urging the necessity for the rejection of the "Poisons Bill" then before that House, and also to take the necessary steps for the formation of an association of Chemists and Druggists.

Respecting the first part of their duty, your committee have the pleasure to report

* Address unnecessary if placed on article sold.

that any lengthened opposition became unnecessary, as on the following day Dr. Tierney thought it most prudent to withdraw the bill, and the matter is now before a select committee of the Legislative Council, and it is believed that a considerable time will elapse before anything more will be heard about "The Poison Regulation Bill." Thus much for the first part of your instructions. And in coming to the subject of the formation of an association, your committee think that from what has already transpired, it is imperatively necessary that immediate steps be taken for the formation of an association which shall be in existence, and at all times ready to take action should any attempt be made to infringe upon the rights and privileges of Chemists and Druggists. The very fact of organisation existing will probably prevent the bringing forward any measure affecting the trade generally, without first submitting it for consideration to the council of the association.

Your committee would, however, desire to place the subject before you for consideration on higher grounds. Desirable as it is to be properly organised, that we may be in a position to repel unjust attacks, it is of greater consequence that we should have an organisation that will enable us to perfect ourselves in the art and science of pharmacy, afford opportunity and appliances for carrying out experiments, and be a means of increasing our knowledge and promoting our comfort. None need be ashamed to own that there is much yet to learn, and a wide field still open for profitable investigation.

Your committee would wish to refer you to the good that has resulted in England from the establishment of the Pharmaceutical Society of Great Britain; and, great as have been the results of its efforts, your committee are strongly of opinion that still greater good will arise from the proper organisation of a society, kindred in its character, for Victoria.

The benefits that might be enumerated are, in the first place, the elevation of the trade in character, proper instruction for apprentices that may hereafter come in, a registry for all competent assistants, and also the formation of a benevolent fund for any indigent or unfortunate members.

Should the society be established and properly supported, a library, museum, lecture-room, and laboratory should be instituted, and these alone would be worth all the trouble and expense that we might find it necessary to incur. By these means the young men and apprentices, and trade generally, would have a suitable place to resort, where they might spend their time in improving themselves in all that is essential for the proper discharge of their duties in the laboratory and shop.

Signed, on behalf of the committee,

G. H. Williams, Secretary.

It was moved by Mr. Cooper, seconded by Mr. Dunstone, "That an Association of Chemists and Druggists be now formed, to be called 'The Pharmaceutical Society of Victoria,' having for its object the advancement of pharmacy, by furnishing such a uniform system of education as shall secure to the profession and the public the safest and most efficient administration of medicine, and the uniting of its members into a recognised and independent body."

Mr. Croad supported the resolution, and urged the propriety of establishing a pharmaceutical journal, as a medium through which the details of the operations of the society shall be made manifest.

Mr. Bowen thought it was premature to attempt to follow too strictly the rules and regulations of the society of the mother country, and recommended that the society should "feel its way" before going into the entirety of the rules of the society of Great Britain.

The report was adopted.

The Honorary Secretary then read the rules of the proposed society, and it was unanimously resolved that the rules should be sent to each individual member. The rules read were those of the Pharmaceutical Society of Great Britain, which appeared to be fully adapted to the Victoria Society.

The Chairman thought that the rules were a little too extended to apply *in toto* to the requirements of the colony, and recommended that a court of examiners be appointed for the purpose of limiting the supply of admissions to the trade.

The resolution was unanimously carried.

Mr. Ford proposed "That the rules be referred to the provisional committee for revision, and that they should be further considered after being printed and circulated."

Mr. Wrentmore seconded the resolution.

Mr. Williams thought the remarks of Mr. Bowen were not altogether correct, as

he considered it would be highly necessary to lay the foundation of the society as broadly as possible, and that the sooner a museum was commenced the more perfect it would become.

Mr. KINGSLAND then proposed, and Mr. PLUMMER seconded, "That the following gentlemen be a provisional committee to carry out the foregoing resolutions, admit members, and disburse expenses: Messrs. Johnstone, St. Kilda; Archer, Thomas, Geelong; F. Cooper, Great Collins Street; French, William's Town; Croad, Blackett, Ford, Bosisto, Coulton, Glover, Lewis, and Williams.

A vote of thanks to the Chairman terminated the proceedings.—*The Melbourne Age*, March 7, 1857.

PEPSINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—It would appear from the pamphlets and scientific papers on the subject of pepsin, or, as it is now termed, pepsine, that it is a discovery of recent invention. Will you therefore permit me the privilege of your valuable columns to prove the contrary to be the fact. It has been in use in the United States of America for many years, under the name of pepsin, and much good has been attributed to its effects.

Amongst the many eminent physiological chemists who have written on its merits, will be found Baron Liebig, in his work on *Animal Chemistry;* Dr. Coombe, on the *Physiology of Digestion;* Dr. Graham, on *Vegetable Diet;* the late Dr. Pereira, on *Food and Diet;* Dr. J. Draper, of New York University; Dr. Carpenter, Professor Silliman, Professor Dunglison, and many others.

Six years since I made experiments on the efficiency of the gastric juice of animals (which I made public in a paper I then published) as a substitute for that solvent in the human stomach, and found that the mucous membrane of the stomach of the calf yielded a more powerful pepsin than that of the sheep or the ox; which opinion is confirmed by some of the learned writers to whose works I have referred. As far as my own observations extend, I have no hesitation in saying that it will be found to form an artificial digestive medium, precisely analogous to the gastric juice, and furnishing a complete and perfect substitute for it; and that in those cases where a deficiency of its secretion is denoted, it will be found a remedy without an equal.

Should, therefore, any of your readers regard pepsin as a recent discovery, I trust these brief remarks will place them right.

I remain, yours most obediently,

Square, Barnstaple, May 6th, 1857. HENRY PARKER.

PATENTS FOR COATING PILLS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—The two processes described in the last number of the *Pharmaceutical Journal* for coating pills, and introduced as something new, have both been the subjects of patents.

A patent for rendering pills tasteless by a coating of gelatine was granted to Mr. William Palmer many years ago—more recently I obtained a patent for coating pills with resinous gum. Any infringement of my patent is an act of dishonesty, and I shall seek redress in the Courts of Law.

I am, Sir, your obedient Servant,

ARTHUR H. COX, Chemist, Brighton.

THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I take the liberty of addressing a few lines to you on the subject of the proposed Act for the Sale of Poisons, now in the House of Lords, to know whether any movement is being made by the trade in general to see that justice is done to us, and that we may not have a bungling piece of machinery made that it will be impossible to work; if any movement is making, I will cheerfully send up my contribution towards it. This colouring system, which our law-makers seem to think so clever, is simply absurd—here, in the country, arsenic is sold consider-

ably; the man who has 1000 sheep may have his 10 lb. of arsenic *un*coloured, but the man who has only 100 must have his coloured with the black or blue. Need I tell you that the farmers won't have their wool dyed gratuitously, and we sell the arsenic white and genuine. Now, as regards the new Act, how are we to colour nux vomica. Some of these very wise heads will be ordering their grooms to get their hunters ready, and to see that the boot-tops, saddles, &c., are all clean; but if the oxalic acid is sent according to their order, will they not be rather surprised to see their grooms with blue tops smiling at their own blue stockings? Take the straw trade—what colour shall we have our women's bonnets, hats, &c.? It can never be sold but as pure oxalic acid. I believe I only express the feelings of the whole trade. The ironmonger sells "driers" in the shape of plumbi acetas, zinci sulphas, &c., with impunity, not even labelled! Was the idea of taking a man's business away from him on a second conviction, obtained from Russia? Certainly 'tis new to English ears. How many dozens of pennyworths of white precipitate are sold by every Druggist in the course of the year? Are the poor people to be sent to the parson of the parish (our rector lives two miles off) to get a certificate that the poor woman merely wants to kill "bobs" in her children's heads. In Dunstable and Luton there are *tons* of oxalic acid annually sold, so also of salt of sorrel.

Your obedient Servant,

Petersfield, 25th May, 1857. HY. NICHOLS.

WE have received the following extract from a newspaper, with comments from a correspondent :—

SUICIDE.

"Yesterday, Mr. C. Jewison, the coroner, held an inquest at the Fox and Hounds Inn, Bradford, touching the death of James Hustler. The deceased, who was thirty-six years of age, resided in Jury Street, North-wing. He had been unwell and in a desponding state of mind for some time. Yesterday morning, about seven o'clock, while his wife was employed at a mill, a young woman discovered him suspended by the neck in the staircase of his dwelling. Some neighbours who were called in cut him down. The jury returned a verdict that the deceased had hanged himself while in a state of temporary insanity."

Please to read the enclosed and consider the importance of obtaining an Act of Parliament to prevent persons selling rope! or stockings! unless the buyer has obtained a certificate from a priest or medical man, or is accompanied by a sane person! of mature age! Also to have all persons buying cutlery! watched, and if found to feel the sharpness of that cutlery, to have them immediately brought before a magistrate, and if not able to give a good account of themselves, to send them to a lunatic asylum forthwith. Also all persons buying firearms to be provided with a certificate from a priest or medical man to the effect that they do not intend to make an improper use of them. Also all persons found walking alone! near the sea or a river, or on a mountain or any precipitous place, to be immediately brought before a magistrate, and if not able to give a good account of themselves, to be sent to a lunatic asylum! That sane priests and medical men be appointed at £2000 per annum to give certificates, &c.; also a larger number of magistrates at the same sum; that grants be made to build lunatic asylums to any extent that may be required. That the person bringing in the Bill to regulate the Sale of Poisons be examined, and if found to have common sense? to be set at liberty; if not, to have his house searched, and if any of the before enumerated articles be found, and he not able to give a good account of himself, that he be taken care of immediately, until an asylum of sufficient magnitude be built to receive him.

SUICIDE FROM MORPHIA.

ON Monday, May 11th, Mr. W. J. Payne held an inquest at the Spotted Dog, Strand, respecting the death of Mr. George Fife, aged 50, who, it was stated, was a medical gentleman of some eminence at Birmingham, and was brother to Sir John Fife. The deceased was a member of Queen's College, and professor of Materia Medica. It was proved in evidence that on Friday evening the deceased went to the shop of Mr. Burfield, chemist, Norfolk-street, Strand, and asked for some morphia, which he said he took in small doses to procure sleep. Mr. Burfield's assistant gave the deceased some morphia in a phial, but said he should not have done so if he had not known him to be a medical man. A tonic medicine was also sold to the deceased at the same time. The deceased went to the Strand Theatre on Friday night, and when he returned home to his lodgings in Surrey-street, Strand, he appeared to be in an excited state from drink. Next morning he was found dead in bed. A surgeon

who was called in said the deceased undoubtedly died from the effects of morphia, and that, presuming the bottle which had contained it had been full, there was enough to kill four persons. According to one witness, the deceased had said that family matters preyed upon his mind. The jury returned a verdict "That the deceased died from an over-dose of morphia, he being at the time in a state of intoxication, but that he had no intention of wilfully destroying his life."

POISONING BY MISTAKE.

TO THE EDITOR OF THE TIMES.

SIR,—A few weeks ago I directed public attention through the medium of your columns to the danger of "children's balloons" in consequence of their being inflated with hydrogen gas. Permit me now to say a few words on a danger of a different kind—viz., the liability, under the present lax state of the law, of swallowing a dose of poison in mistake for medicine.

The following narrow escape has just occurred in this city:—A lady was ordered by her medical attendant to take two teaspoonfuls of the tincture of rhubarb, and the usual bottle was returned to the druggist for the purpose of being refilled. The master of the shop was absent, and a boy, left in charge, supplied the demand by pouring inadvertently the tincture of opium (laudanum) into the bottle labelled "Tincture of rhubarb;" and nearly two teaspoonfuls of this narcotic poison, instead of the prescribed medicine, had already reached the lips of the patient, when her sister's attention was excited by the colour, and the mistake was discovered. Had the dose been swallowed, no human skill could, under the peculiar circumstances, have saved the lady's life.

I am aware that legislative measures are in contemplation to meet the danger that arises from boys, or incompetent men, being allowed to dispense poisonous drugs. The publication of facts bearing on this important subject may accelerate the movement. It is full time that a remedy was provided against the recurrence of the danger; and, let me add, that in Scotland, where there are no coroners' inquests to search into the causes of accidental death—a deficiency greatly to be deplored—the most stringent measures ought to be adopted to regulate the sale of poisons.

I remain, Sir, your obedient servant,

Glasgow, May 18. M.D.

CARELESSNESS IN THE SALE OF POISONS.

AN inquest was held on Monday last at Louth, on the body of a child aged two years and five months, named Charles Houseman, son of Samuel Houseman, a gardener. It appears that a phial of laudanum was left by Houseman upon a table, and that the child drank a portion of it, and was found in a state of stupor. It died the same night. The man who sold the poison was a grocer, who keeps it for the "accommodation" of the public, but does not even label the bottles. The coroner said to this man—"If death had resulted to an adult person you would have been placed in a most perilous position. Not only have you neglected to place a label on the phial describing the contents as poison, but you allowed it to go out of your shop with a label upon it describing the contents to be 'Dalby's Carminative,' a harmless mixture. You see it is now upon the bottle. In this case, however, the deceased child was so young that it could not read, but had it been otherwise you would have been placed in an awful position. I would recommend you to be careful." The jury, after a short consultation, returned a verdict of "Accidental death."—*Times*, May 23.

BOOKS RECEIVED.

TRANSACTIONS OF THE MEDICAL AND PHYSICAL SOCIETY OF BOMBAY, *for the Years* 1855 *and* 1856. Bombay: Printed at the Bombay Education Society's Press, 1857.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY, *including the Practice of the Collodion Process.* By T. FREDERICK HARDWICH, Lecturer on Photography in King's College, London, &c. Fourth edition. London: John Churchill, New Burlington-street, 1857. (From the Author.)

ON THE CONSTITUTION OF ALLOPHANE. By AUGUSTUS BEAUCHAMP NORTHCOTE, F.C.E., &c. 1857. (From the Author.)

GOD IN DISEASE; *or, the Manifestations of Design in Morbid Phenomena.* By JAMES FOULIS DUNCAN, M.D., &c. Second edition. London: James Nisbet & Co., Berners Street. Dublin: George Herbert. 8vo, pp. 323. 1857.

TO CORRESPONDENTS.

W. M. H. (Dublin).—As the Pharmacy Act does not apply to Ireland, the Society has no power to prevent the use of the title "Pharmaceutical Chemist" by unqualified persons in that part of the kingdom.

J. T. (York).—(1.) *Oil of Tobacco:* see vol. iii., p. 342; and Pereira, *Mat. Med.*, p. 1426. (2.) The examinations in Botany are conducted according to the natural system.

W. E. (London).—When Liquor Antimonii Tartarizati is ordered, we think Vinum Antimonii Potassio-tartratis is generally intended; but it would be more correct to use the former, which is still retained in the Dublin Pharmacopœia.

M. P. S. (Bristol) should apply, by letter, to Professor Morton, Veterinary College, Camden Town.

G. W. (Derby).—Lindley's *School Botany*, price 5*s.* 6*d.* Bradbury & Evans.

Dolor (London).—The label referred to is scarcely liable to the stamp duty, but is sailing very near the wind.

W. P. (Liverpool).—Hooper's *Medical Dictionary*, last edition.

C. T. E.—Coating of Pills: see p. 546 of our last number.

Verus (Liverpool).—In the mixture alluded to, the addition of mucilage is necessary to prevent the separation of the balsams.

A. B. C.—It would be invidious to answer such a question in this journal.

T. P. (Cork).—The specimen of quackery has been received.

A Member, who signs himself "One who desires to expel those who do any act unbecoming their position," wishes to draw attention to the fact, that some Members of the Pharmaceutical Society make use of a "halfpenny newspaper" as an advertising medium.—[We cannot quite see how the price of the newspaper affects the question.]

Mr. Kernot (Poplar) and *Mr. Rook* (Sittingbourne) are thanked for their enclosures.

Delta (London).—The *Journal de Pharmacie et de Chimie* is published under the direction of a committee of sixteen Chemists. It may be obtained through Messrs. Williams & Norgate, Henrietta Street, Covent Garden.

A. Z. (London).—(1.) *Bastick's Medicated Cod Liver Oil*, vol. xiv., page 427. (2.) No.

A Student (Evesham).—(1.) The work is useful to a beginner. (2.) In some cases.

J. W. (Cork).—The specimen of Bark sent to us is "Quillaia saponaria," native of Chili. See *Chemical Gazette*, vol. ii., p. 216.

Mr. Turner, Mr. Large, Mr. Rimmington, Mr. Southall, and several other correspondents, some of whom have been answered by post, have written on the subject of the Poison Bill.

A. P. S.—There is nothing remarkable in the extract. Judging from its appearance, we should say it is of average quality.

Mr. Tuff (Enfield).—There was no opportunity of reading the letter at the meeting. One of the subjects was discussed; the others have not been overlooked.

W. J. (Manchester).—Jeremie's solution of opium is a quack medicine, of which we have no formula.

Botanicus (March).—(1.) Normandy's *Agricultural Chemistry*.—(2.) We know of no work (arranged according to the Linnean system) answering to the description given. Lindley's *Vegetable Kingdom* is the best work.

R. E. (Huddersfield), *M. P. S.* (Glasgow).—We are unable to give the information.

Errata.—Page 541, line 14 from bottom, *for* De Vallenger, *read* De Valangin.—Page 572, line 4, *for* 3 lbs. of salt to one of flowers, *read* 1 lb. of salt to 3 of flowers. This error was corrected by Mr. Haselden in the number following that in which his paper appeared.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

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C. WHITING, BEAUFORT HOUSE, STRAND.